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ABSTRACT

In the "Gradcost III" study, relatively simple procedures have been developed for estimating the costs of graduate degree programs based on use of definitions and data generally available in U.S. graduate schools. Graduate degree program costs are taken to be the sum of three elements: departmental costs, allocated from departmental budgets; institutional support costs, apportioned from institutional expenditure reports; and graduate student appointment costs. Research program costs are approximated as the sum of unrestricted fund expenditures for departmental research, and restricted fund expenditure for sponsored research: the former is counted as a cost of both the departmental research and instruction programs, and the latter for the research program only. The developed procedures are applied to data collected from 14 U.S. colleges and universities in the fields of biochemistry, cell biology, chemistry, economics, English, mathematics and psychology. Average, upper, and lower quartile graduate degree program costs per enrolled graduate student and per graduate degree awarded are estimated. Estimated departmental costs are correlated to some extent with certain characteristics of individual departments and institutions. The procedures and results are discussed, and certain recommendations are set forth. The supplement contains a summary of the parent report, a glossary of terms, institutional questionnaire and departmental questionnaire for chemistry, procedures for calculations, illustrative calculations, and correlations. (Author/SPG)

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THE COSTS AND BENEFITS OF GRADUATE EDUCATION: ESTIMATION OF GRADUATE DEGREE PROGRAM COSTS

By

Joseph L. McCarthy and William D. Garrison

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A supplementary report,

> The Costs and Benefits of Graduate Education; Estimation of Graduate Degree Program Costs; Supplement with Detailed Procedures and Illustrative Calculations
>
> by Joseph L. McCarthy and William D. Garrison
> The Council of Graduate Schools, 1978

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PREFACE

Studies on costs and benefits of graduate education were begun in 1968 in response to a resolution adopted at the Annual Meeting of the Council of Graduate Schools in the United States (CGS). Two investigations have been completed, and a number of papers have been published as described in the introductory paragraphs of the present report.

This "Gradcost III" study was initiated in 1974 with the assistance of a grant of $186,432 by the National Institutes of Health.

General guidance for the project has been provided by the Gradcost III Committee:

*David R. Deener, Chairman
Tulane University

**J. Chester McKee
Mississippi State University

Charles Lester
Emory University

S. D. Shirley Spragg
University of Rochester

Joseph L. McCarthy
University of Washington

J. Boyd Page
Council of Graduate Schools

*Deceased, 1976. **CGS Chairman - 1977. CGS Chairmen who served in prior years as members of the Gradcost III Committee are: Sanford E. Elberg, University of California-Berkeley; S. D. Shirley Spragg; and Jacob E. Cobb, Indiana State University.

The CGS made contracts with the University of Washington where Drs. Joseph L. McCarthy and William D. Garrison of Washington functioned as Director and Associate, respectively, for the study, and with Tulane University where Dr. David R. Deener served as Co-director. Following the untimely death of Dr. Deener, the work was completed at Washington.

As initial step a number of colleges and universities electing to participate in the study were identified and, an academic and fiscal officer from each institution served as members of an Advisory Committee.

Participating institutions and Advisory Committee members included the following:

Brown University
Ernest S. Frerichs
William Wright

Emory University
Charles T. Lester
Raymond C. Otwell, Jr.

Indiana State University
Mary Ann Carroll
Donald Hilt

Indiana University
Harry G. Yamaguchi
James King

Kansas State College at Pittsburg
J.D. Haggard
Clifford E. Bougher

Tufts University
Charles G. Nelson
Jack Dunn

Tulane University
David R. Deener
Jess B. Morgan

University of Iowa
D.C. Spriestersbach
James F. Jakobsen

University of Texas
William F. Lasher
Irwin Lieb

University of Washington
Morgan D. Thomas
Robert Thompson

University of Wisconsin
Robert M. Bock
Peter Bunn

Members of the Advisory Committee made important contributions to the study by arranging for responses to questionnaires, by attending meetings to discuss progress of the investigation, by commenting on drafts of reports, and in many other ways.

Institutions requested that the data and information relating to individual institutions be considered confidential. This request has been carefully respected.

The results of the Gradcost III activity are presented in two papers:

The Costs and Benefits of Graduate Education: Estimation of Graduate Degree Program Costs
by Joseph L. McCarthy and William D. Garrison

The Costs and Benefits of Graduate Education Estimation of Graduate Degree Program Costs - Supplement with Procedural Details and Illustrative Calculations
by Joseph L. McCarthy and William D. Garrison

The second paper is being offered as a record document to the Educational Resources Information Center (ERIC), Washington, D.C., 20202.

The Council trusts that these reports do make important contributions to the understanding and development of concepts and procedures for estimation of the costs of graduate education. Specific estimates of costs have been made, but we emphasize that these are included simply to illustrate the utility of the developed concepts and procedures. The report sets forth a number of recommendations which we hope will be carefully considered by those having an interest in this complex and important subject.

This statement has been endorsed in principle by the Executive Committee of the Council of Graduate Schools in the United States. It is not an official statement of the CGS, nor of any of the individual colleges or universities participating in the study. The authors carry personal responsibility for the contents of the reports.

Significant contributions have been made by representatives of the National Institutes of Health; by Dr. Stephen Hatchett prior to his death in September, 1976, and thereafter, by Dr. Carl D. Douglass, Jr.

To all of the many persons associated with departmental, institutional research, fiscal, graduate school, and other offices of the colleges and universities participating in the study, gratitude is expressed for their indispensible help and advice.

The leadership of the late Dr. Deener in helping to initiate the project, and in collaborating with Drs. McCarthy and Garrison in advancing the investigation up until his death, is deeply appreciated by his many friends and associates within and outside of the CGS.

The continuing involvement and wise counsel of those who have served on the Gradcost III Committee is gratefully acknowledged.

Finally, the Council is particularly appreciative of the major contributions of Joseph L. McCarthy and William D. Garrison in carrying this significant study through to completion and publication.

J. Boyd Page

J. Boyd Page, President
Council of Graduate Schools
in the United States

THE COSTS AND BENEFITS OF GRADUATE EDUCATION
ESTIMATION OF GRADUATE DEGREE PROGRAM COSTS [1a, 1b]

by

Joseph L. McCarthy[1c] and William D. Garrison[1d]

ABSTRACT

In the "Gradcost III" study, relatively simple procedures have been developed for estimating the costs of graduate degree programs based on use of definitions and data generally available in the graduate schools of the United States. Colleges and universities are considered to offer three types of programs: Instruction, Research, and also Public Service which is not of present significance. Instructional programs lead to Bachelor, Masters and Doctors degrees. Graduate degree program costs are taken to be the sum of three elements: departmental costs, which are allocated from departmental budgets; institutional support costs, apportioned from institutional expenditure reports; and graduate student appointment costs. Research program costs are approximated as the sum of unrestricted fund expenditures for departmental research, and restricted fund expenditure for sponsored research: the former is counted as a cost of both the departmental research and instruction programs, and the latter for the research program only. The developed procedures have been applied to data collected from fourteen United States colleges and universities in the fields of Biochemistry, Cell Biology, Chemistry, Economics, English, Mathematics and Psychology. Average, and upper and lower quartile graduate degree program costs per enrolled graduate student and per graduate degree awarded have been estimated. Estimated departmental costs have been correlated to some extent with certain characteristics of individual departments and institutions. The procedures and results are discussed, and certain recommendations are set forth.

[1a] This statement has been endorsed in principle by the Executive Committee of the Council of Graduate Schools in the United States. However, it is not an official statement supported by the university with which the authors are associated, nor by any of the colleges and universities which have participated in the present study. The authors carry personal responsibility for the content of the reports. [1b] For the important advice and assistance received, the authors are deeply grateful to our deceased friends and colleagues, Drs. David R. Deener and Stephen Hatchett; to each of the members of the CGS Gradcost Committee and the Advisory Committee; to the departmental, research, fiscal and graduate school officers of the several participating colleges and universities; and to the National Institutes of Health which provided funds to assist in its support, J.L.M. and W.D.G. [1c] Dean Emeritus of the Graduate School and Professor of Chemical Engineering and Forest Resources, University of Washington. [1d] Research Associate, University of Washington, Seattle, Washington.

1. THE GRADCOST STUDY

Graduate education has come under intensive scrutiny during the last few years, and special attention is now being paid to its costs and benefits.

The basic questions are: What is the nature of graduate education? How and where should it be offered? What are its costs and benefits? Who receives these benefits? Who should pay its costs?

Several years ago, the Council of Graduate Schools in the United States initiated the "Gradcost" studies in order to help find answers to these questions. Gradcost I produced three publications, and was assisted by substantial funds provided by the National Science Foundation. In two papers[2,3], our colleagues John H. Powel and Robert D. Lamson analyzed the costs and benefits of graduate education after a comprehensive review of all the available literature and documents in the field. In the third publication, Joseph L. McCarthy and the late David R. Deener summarized these reviews and provided a commentary with recommendations as to how questions relating to the costs and benefits of graduate education might be viewed in the light of the presently prevailing graduate school arrangements and attitudes[4]. Further studies were conducted with funding assistance from the Council of Graduate Schools in the United States, and these results have been described in the Gradcost II report[5] recently transmitted to the CGS by McCarthy and Deener.

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(2) Powel, John H., Jr., and Lamson, Robert D., "Elements Related to the Determination of Costs and Benefits of Graduate Education." The Council of Graduate Schools in the United States, Washington, D.C., March 1972. (3) Powel, John H., Jr., and Lamson, Robert D., "An Annotated Bibliography of Literature Relating to the Costs and Benefits of Graduate Education." The Council of Graduate Schools in the United States, Washington, D.C., March 1972. (4) McCarthy, Joseph L., and Deener, David R., "The Costs and Benefits of Graduate Education: A Commentary with Recommendations." The Council of Graduate Schools in the United States, Washington, D.C., March 1972. (5) McCarthy, Joseph L., and Deener, David R., "The Costs and Benefits of Graduate Education: A Preliminary Study of Two Approaches to Estimation of the Cost of Chemistry Ph.D. Programs at Two Universities." The Council of Graduate Schools in the United States, Washington, D.C., November 1975.

The now-reported Gradcost III study, initiated in 1974, is concerned with alternative methods for estimating the costs of Masters and Doctors programs, and the application of such methods in a number of representative fields at fourteen universities and colleges in the United States. A "Supplement" giving procedural details and illustrative calculations has been prepared[6], and an informal summary may soon be available. The study has received major funding assistance from the National Institutes of Health.

2. OBJECTIVES

Our main objective has been to identify one or more relatively simple procedures appropriate for estimation or approximation on a consistant basis of graduate degree program costs in several fields at a number of different colleges and universities.

A second objective has been to apply the identified procedure or procedures to the several selected fields at a number of different colleges and universities, and for each of a number of years.

We have sought generally applicable procedures, based upon the definitions prevailing and data available at most institutions offering graduate degree programs, for securing estimations or approximations of graduate program costs. It has not been our object to develop detailed measurements following the methods of accounting.

Of interest have been only those procedures providing for "closure" whereby the total annual expenditures made by the institution would approximately equal the sum of the annual expenditures made in each department and other unit if the same selected procedures were applied to all academic and other units throughout the university.

A further objective has been to identify and call attention to those primary sources of data for estimation of costs which need to be made more precise in order to permit better approximation of costs to be obtained by application of the developed or other procedures.

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(6) McCarthy, Joseph L., and Garrison, William D., "The Costs and Benefits of Graduate Education: The Estimation of Graduate Degree Program Costs - Supplement with Procedural Details and Illustrative Calculations," Educational Resources Information Center, (ERIC), Washington, D. C., 20202.

3. GENERAL APPROACH

Our conception of the overall working of a university or college is summarized pictorially in Figure 3-1[7] in relation to its students, faculty, staff and administration and the community, and also in relation to the sources and expenditures of its funds. We visualize that a college or university usually conducts three main types of programs - Instruction, Research, and Public Service - and that these ordinarily overlap substantially.

The structure of this study is based on recognition of a graduate degree program as defined by the Council of Graduate Schools in the United States[8]:

> "That the essence of graduate education is in the graduate degree program and, therefore, the graduate degree program is the appropriate basis for consideration . . . of graduate work;
>
> "That a graduate degree program should be defined as that set of academic experiences offered to a graduate student which are to be satisfactorily completed in order to make appropriate the award by the academic institution to the student of a graduate degree such as Master or Doctor;"

The second basis of our approach is the longtime and widespread agreement that the primary objective of Doctor of Philosophy (Ph.D.) degree programs is to select and train men and women to find new knowledge. This proposition has been reaffirmed recently by both the Association of Graduate Schools in the Association of American Universities, and the Council of Graduate Schools in the United States[9]. The objectives of Masters programs are more diverse.

The graduate program cost literature published up to about 1972 was reviewed and summarized by Powel and Lamson[2,3], and a few papers published more recently are discussed below.

For present purposes, we define the graduate degree program annual Total Cost as the total monies expended during a twelve month year by or through a college or university to provide for the operation of a particular graduate degree program, irrespective of source of the funds. The graduate degree program Unit Cost is the graduate

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(7) All figures generally follow the Chapter to which they relate. (8) "Policy Statements." The Council of Graduate Schools in the United States, Washington, D.C., (1970). (9) "The Doctor of Philosophy Degree," a joint statement by the Council of Graduate Schools in the United States, and by the Association of Graduate Schools in the United States, 1 Dupont Plaza, Washington, D.C., (1968); now revised and republished by the Council of Graduate Schools (1977).

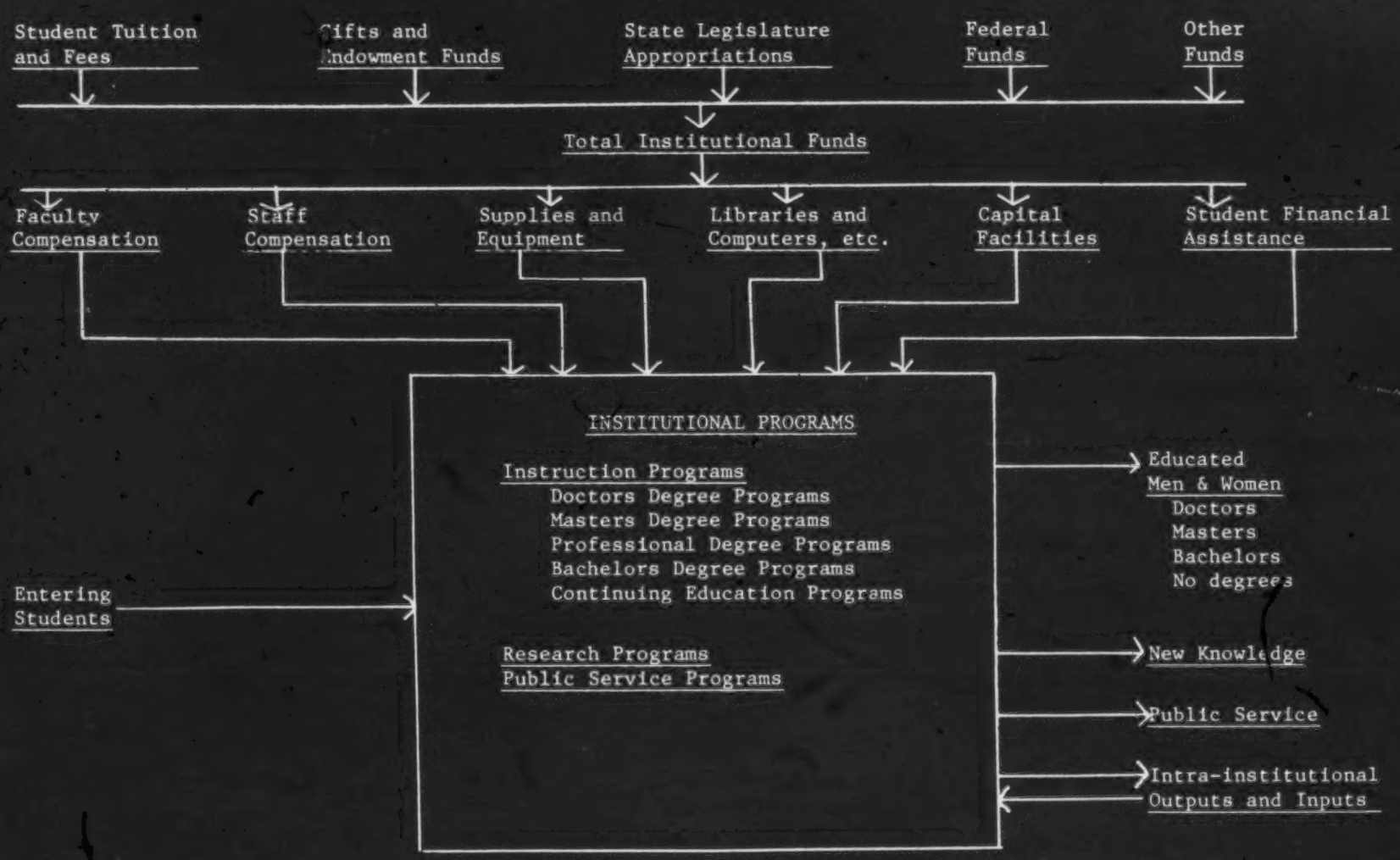

FIGURE 3-1 OUTLINE OF COLLEGE OR UNIVERSITY PROGRAMS SUGGESING INPUTS AND OUTPUTS

degree program annual Total Cost divided by some number representing a program unit such as the number of enrolled graduate students.

We recognize that many different costs can be defined and estimated with respect to graduate degree programs, such as costs to the students, including foregone opportunity costs, to the institution, to the State Legislature, to private donors, to the national government, and to society, but our concern has been with graduate degree program costs as defined above.

We have taken the costs of the first year of graduate work to correspond approximately to the annual costs associated with offering a Masters program, and the costs of subsequent years to represent the costs of the Doctors program. This approach has the shortcoming of not recognizing first year graduate students as participants in a Ph.D. program in spite of the fact that all or many such students at some universities aspire toward the Ph.D. and indeed were selected on this basis by admissions committees. Certain two year Masters programs are also not recognized. However, the choice permits useful comparisons to be made irrespective of differences in institutional policies and/or nomenclature.

Seven typical graduate program fields were selected for study: English, a non-laboratory humanity; Economics, a social science; Psychology, a social science with a significant laboratory involvement; Mathematics, a non-laboratory science in which sponsored research is often important; Chemistry, a laboratory science in which sponsored research is of major importance; Biochemistry, a laboratory science often functioning as a department within a medical school in which sponsored research is also of major importance; and finally Cell Biology, a non-departmentalized field for which results from studies of other departmentalized fields may be used to generate estimates of graduate program costs.

Representatives of fourteen colleges and universities agreed to collaborate in the study. These institutions are geographically dispersed throughout the United States. Eleven and two, respectively, grant Doctor of Philosophy and Masters degrees as their highest awards. One grants only the Bachelors degree. Half are public institutions. Student enrollments range from a few thousand to over forty thousand.

As a condition of participation, representatives of most institutions asked that the cost data provided by their universities and the resultant cost estimates be considered confidential. Thus, cost data and estimates are not identified with individual institutions.

An Advisory Committee consisting of one academic and one fiscal representative of each participating institution gave valuable guidance and assistance to the Gradcost III study.

Data were secured in part from formal all-institutional reports[10] which we received from each participating university. Some all-institutional data and most departmental data were collected using a number of questionnaires which were completed by persons associated with individual departments, the fiscal offices, and/or the office of the Dean of the Graduate School.

The procedures for carrying out cost estimations, as well as the text of the several questionnaires, were proposed by the authors, reviewed by the Advisory Committee, then written in final form, and are set forth in detail in the Supplement[6].

Generally, we have allocated to graduate programs three types of costs - departmental expenditures, institutional support expenditures, and student appointment expenditures. Departmental expenditures comprise the most important cost element, and thus several alternative procedures for making allocations from departmental budgets have been studied. Graduate work conducted in departments is given "institutional support" to provide for operation of libraries, student services, plant operation and maintenance, etc., and this cost element is covered mainly by allocations from all-institutional funds. Student appointment expenditures which provide for Fellowships and Assistantships comprise the third element, and these, although usually small, may be significant relative to the recruitment and retention of able graduate students. Special attention is given below to Research Program expenditures, including

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(10) Examples of such reports are: (1) Tulane University Financial Report 1973/1974 (Tulane University, New Orleans, 1975). (b) Indirect Cost Computation, 1973-74 (Tulane University, New Orleans, 1973-74). (c) Financial Report 1974 (University of Washington, Seattle, 1975). (d) University of Washington Financial Statements for the Year Ending June 30, 1974 (University of Washington, Seattle, 1974). (3) University of Washington Annual Study of Indirect Costs, July 1, 1972 - June 30, 1973 (University of Washington, Seattle, 1973).

both departmental and sponsored research funds, since these are closely related to graduate degree programs. Finally, appropriate elements are brought together to yield our estimates of graduate degree program costs.

4. INSTITUTIONAL FUNDS

The funds, expended each year by a college and university as described in Annual Reports[10], are usually presented in two separate categories, "unrestricted" and "restricted" funds.

4.1 Unrestricted Funds

Unrestricted funds come to an institution from student fees, state legislative appropriations, endowment income, and private gifts, and these monies may be used for any purpose deemed appropriate by the administration and trustees to advance the central purposes of the institution. Unrestricted fund expenditures are usually reported in certain categories as illustrated in Table 4-1 for a fictitious institution which we shall call Learned University. These categories have become nearly standardized mainly as a result of the effective activities of the National Association of College and University Business Officers (NACUBO).[11]

The 1973-1974 institutional total and categorical expenditures of the several participating colleges and universities were divided by the reported numbers of full time equivalent faculty members to obtain the results shown in Figure 4-1[12].

The largest institutional expenditure category is instruction and departmental research, and allocations from this category are made to departmental budgets, which, in turn, provide basic funding for graduate programs. Other major expenditures provide for plant operation and maintenance, student services, libraries, general operation and administration, and these comprise the "institutional support" for the academic activities of the departmental units.

Certain other unrestricted institutional fund expenditures shown in Table 4-1 have not been considered as graduate degree program cost elements because they are concerned with activities which do not bear

(11) Acronyms and certain abbreviations are defined in Table 4-2.

(12) In this report, results are represented as histograms with tabulations of numbers superimposed. The horizontal bar and the numbers written thereon represent the mean of the values available. To suggest the range of values considered, just above and below this mean are shown upper quartile and lower quartile values which are those ranking one-fourth and three-fourths in order from the highest to the lowest. The number of values dealt with is shown in parenthesis following the mean value. The "total" values are the sums of the mean values. Sometimes averages are larger than upper quartile values because of skewed data.

TABLE 4-1

CURRENT FUND EXPENDITURES FOR THE 1973-4 YEAR OF THE FICTITIOUS LEARNED UNIVERSITY[a]
(in thousands of 1973-4 U.S. dollars)

	Total (%)	Unrestricted (%)	Restricted[b] (%)
Instruction and Departmental Research	$ 82,407 (40)	$ 67,675 (50)	$ 14,732 (20)
Sponsored Research	50,435 (24)	0 (-)	50,435 (70)
Other Separately Budgeted Research	1,168 (-)	1,150 (-)	18 (-)
Libraries	6,256 (3)	6,032 (4)	224 (-)
Student Services	5,168 (2)	4,950 (4)	218 (-)
Operation and Maintenance of Plant	11,819 (6)	11,802 (9)	17 (-)
General Administration	7,574 (4)	7,457 (5)	117 (-)
General Institutional Expense	3,940 (2)	3,924 (3)	17 (-)
Extension and Public Service	5,159 (2)	3,159 (2)	2,001 (3)
Student Aid	4,754 (2)	0 (-)	4,754 (7)
Auxiliary Enterprises	12,790 (6)	12,790 (9)	0 (-)
Hospital	16,891 (8)	16,891 (12)	0 (-)
TOTAL	$208,363 (100)	$135,830 (100)	$72,533 (100)

[a]Excluding transfers. [b]Restricted funds expenditures include only the Direct Costs of Grants and Contracts, and not the Indirect Costs. [c]The approximate percentages of the total for each column are shown within the parentheses with a dash indicating less than one percent.

TABLE 4-2

SIGNIFICANCE OF AND REFERENCES TO CERTAIN ACRONYMS AND ABBREVIATIONS

		Section
CGS	Council of Graduate Schools in the United States	1
CLASSCUT	Procedure for Estimation of Departmental Costs	5.1
COMPCUT	Procedure for Estimation of Departmental Costs	5.3
COMPCUT-MD	Procedure for Estimation of Departmental Costs - Multi-Department	6.8
COMPCUT-TP	Procedure for Estimation of Departmental Costs - Typical Program	6.11
CREDCUT	Procedure for Estimation of Departmental Costs	5.2
DCOST	Annual Departmental Costs per Graduate Student	10.2.1
DISS	Dissertation for the Doctoral Degree	6.2
ECE	Equal Credit Equivalent	6.9
ERIC	Educational Resources Information Center	2
FAA	Faculty Activity Analysis	6.3
FACT	Faculty Cost per Graduate Student Per Year	10.2.1
FTE	Full Time Equivalent	6.1
GC	Graduate Classes	6.2
GSCH	Graduate Credit Hours per 1000 Department Total	10.2.1
GRADCOST	CGS Project Studying Graduate Program Costs	1
IS	Independent Study	6.2
ISTH	Independent Study and Masters Thesis	6.2
LD	Lower Division, i.e., Freshmen and Sophmores	6.2
NIH	National Institutes of Health	1
NPHD	Number of Ph.D's Awarded Annually per 1000 Graduate Students	10.2.1
NSF	National Science Foundation	1
Ph.D.	Doctor of Philosophy Degree	3
R	Ratio of FAA Teaching to SCH	6.3
ROOSA	Decile Ranking of Department by Peer Appraisal	10.2.1
SA	Scholarly Activity	6.3
SCH	Student Credit Hours, Usually Semester	6.2
SIZE	Number of Graduate Students Enrolled in a Program	10.2.1
SPONR	Sponsored Research Funds Per Faculty Member Per Year	10.2.1
TA	Teaching Assistant	6.1
TH	Masters Thesis	6.2
TYPE	Public or Private Institutions	10.2.1
UD	Upper Division, i.e., Juniors and Seniors	6.2
UG	Undergraduate	6.2
XOA	Crossover Analysis	6.4

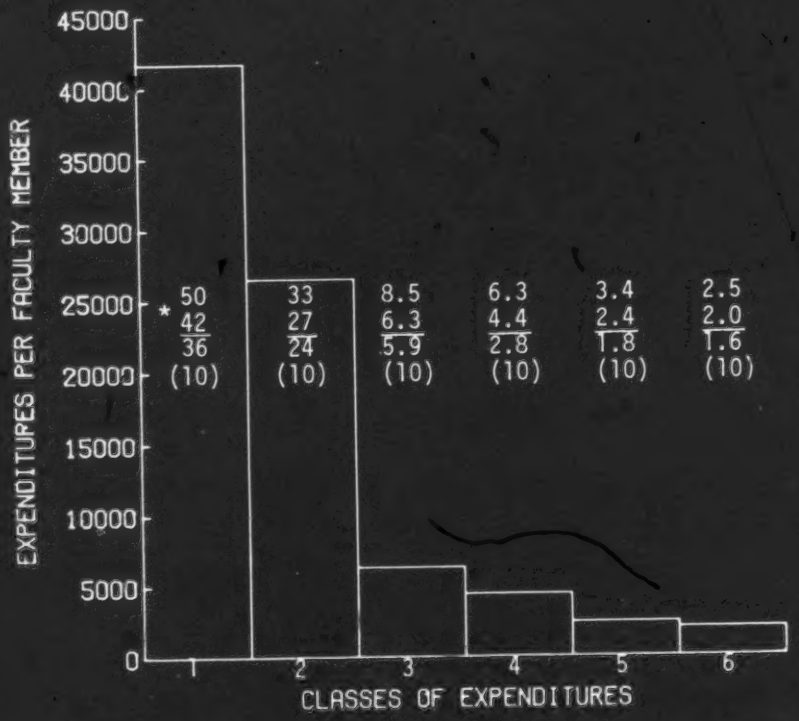

FIGURE 4-1: AVERAGE INSTITUTIONAL EXPENDITURES PER FACULTY MEMBER

(*UNRESTRICTED FUNDS IN THOUSANDS OF DOLLARS)

1 = TOTAL 2 = INSTRUCTION AND DEPARTMENTAL RESEARCH

3 = OPERATION AND MAINTENANCE OF PLANT

4 = GENERAL INSTITUTIONAL AND ADMINISTRATION

5 = LIBRARIES 6 = STUDENT SERVICES

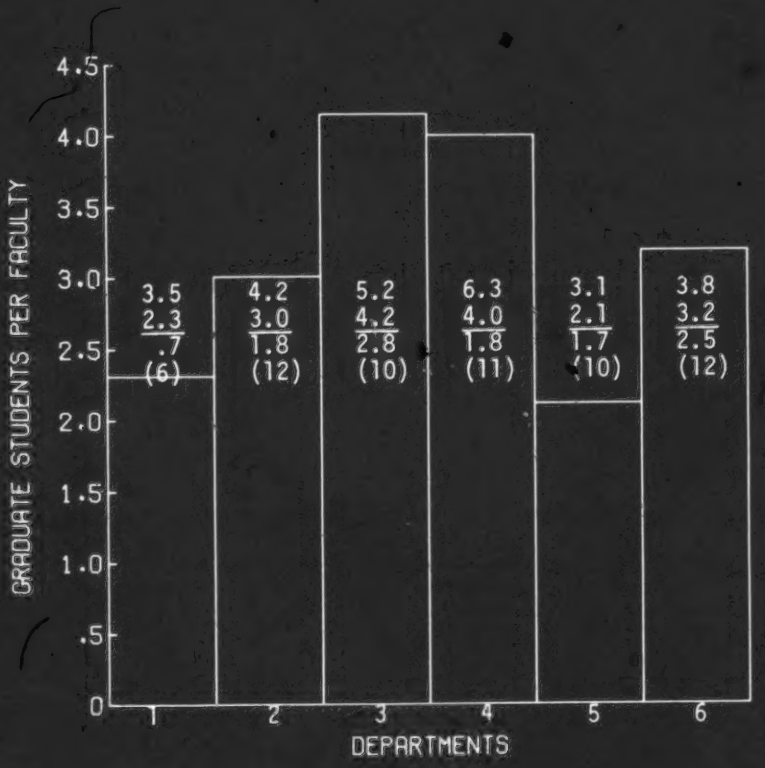

FIGURE 5-1: NUMBERS OF GRADUATE STUDENTS PER FACULTY MEMBER

1 = BIOCHEMISTRY 2 = CHEMISTRY 3 = ECONOMICS

4 = ENGLISH 5 = MATHEMATICS 6 = PSYCHOLOGY

directly on academic programs (e.g., public service, etc.), or because they are conducted usually on an approximately self-sustaining basis (e.g., auxiliary activities such as student residences, food service, parking facilities, etc.), or with special funding (e.g., hospitals, etc.).

4.2 Restricted Funds

Restricted funds are those dedicated, often exclusively, to the payment of all or some of the costs associated with particular activities as specified by the donor, grantor, or contractor, and agreed to by an appropriate representative of the institution. Such funds are often used to support scholarships, fellowships, or specified academic activities, etc.

Restricted funds of major magnitude provide partial support for research at some universities. These funds are of particular interest, because sponsored research bears a close relationship with graduate degree programs, and especially with research work conducted for Doctors dissertations and Masters theses, as is discussed below in Chapter 9.

4.3 Capital Funds

Capital funds are used by colleges and universities to pay for institutional buildings and other fixtures, and permanent equipment. These funds have not been included as graduate degree program cost elements because of the differing concepts and procedures relating to the handling of such funds at individual institutions, and because emphasis in the present study is on operating costs.

5. DEPARTMENTAL COSTS - GENERAL AND PROCEDURAL ALTERNATIVES

The departmental expenditures reflected in a departmental budget are assumed to be made in favor of three types of programs - the Instructional Programs (consisting, more specifically, of the Bachelors Program, the Masters Program, and the Doctors Program), the Research Program and the Public Service Program (Figure 3-1).

Our examination of available departmental budget papers has shown that allocations to the Public Service Program are relatively small, and thus these have been neglected.

The unrestricted funds appropriate to allocate from the departmental budget to the departmental Research Program, in our opinion, are included within those associated with the Instruction Programs as is discussed

below in Chapter 9, and, therefore, one central problem in the present study has been how most rationally to make allocations from the departmental budget to the Instructional programs (i.e., the Bachelors, Masters, and Doctors programs) offered by the subject departmental faculty.

Five allocation procedures have been considered, and each is described in detail in the Supplement along with illustrative stepwise calculations for the Chemistry Department of fictitious Learned University.

Three procedures, identified as "CLASSCUT," "CREDCUT," and "COMPCUT," (these and other acronyms are defined in Table 4-2) will now be described briefly, and their main advantages and disadvantages summarized.

5.1 CLASSCUT

The CLASSCUT procedure (Table 5-1) is based upon two propositions: that the cost of the faculty time used for preparation and presentation of instruction to a class is about the same for every class; and that each class can be assigned to a particular instructional program depending upon identification of its main clientele or proportion of major enrolled Doctor, Master, or Bachelor students.

To apply the procedure to "cut", or to allocate total departmental budget expenditures, this sum is divided by the number of classes taught by the departmental faculty to obtain the departmental cost per class. This unit cost per class is then multiplied by the number of classes deemed to be taught in favor of students in a particular degree program (e.g., the Masters Program) to obtain the total departmental cost of the subject program. The cost per student is obtained by dividing the total by the number of students enrolled in the program.

This procedure offers the major advantage of simplicity, but suffers from three primary difficulties. Firstly, classes sometimes cannot clearly be allocated to the Masters vs. the Doctors Program, or to the Bachelors vs. the Masters program, since both may be served. Secondly, faculty activity relating to individual students such as Independent Study, Masters Thesis and Doctors Dissertation supervision is difficult to equate to activity relating to formal classes. Thirdly, no recognition is given to the presumed additional quality and/or quantity of effort by professors in preparing for advanced versus beginning classes. A modification of the CLASSCUT procedure called "CLADCUT," whereby some arbitrary weighting in favor of advanced classes was used, was studied in a preliminary manner, as described in the Supplement.

TABLE 5-1

OUTLINE OF CLASSCUT, CREDCUT AND COMPCUT PROCEDURES FOR ESTIMATION OF DEPARTMENTAL COSTS[a]

CLASSCUT

1. $\left[\frac{\text{Annual Dept. Budget \$}}{\text{Annual number of Dept. classes}}\right]$ = \$/class

2. $\left[\text{\$/class}\right] \times \left[\text{classes taken by enrollees in program}\right]$ = \$/program

3. $\left[\frac{\text{\$/program}}{\text{Number of Enrollees}}\right]$ = \$/student

CREDCUT

1. $\left[\frac{\text{Annual Dept. Budget \$}}{\text{Annual number Dept. SCH}}\right]$ = \$/SCH

2. $\left[\text{\$/SCH}\right] \times \left[\text{SCH taken by enrollees in program}\right]$ = \$/program

3. $\left[\frac{\text{\$/program}}{\text{Number of enrollees}}\right]$ = \$/student

COMPCUT

1. [Annual Dept. Budget \$] ---Allocation By FAA---> = \$/level

2. $\left[\frac{\text{\$/level}}{\text{SCH/level}}\right]$ = \$/SCH by level

3. $\left[\sum^{\text{level}} (\text{\$/SCH by level}) \times (\text{SCH in program})\right]$ ---Allocation By XOA---> = \$/program

4A. $\left[\frac{\text{\$/program}}{\text{Number of enrollees}}\right]$ = \$/student

4B. $\left[\frac{\text{\$/program}}{\text{Number of awarded degrees}}\right]$ = \$/degree

[a] More specific descriptions of the CLASSCUT, CREDCUT, and COMPCUT procedures are given in Sections 5.1, 5.2 and 5.3, respectively.

TABLE 5-2

INDIVIDUAL DEPARTMENTAL COSTS[a] FOR CERTAIN FIELDS ESTIMATED BY THREE PROCEDURES

INSTITUTION	Chemistry			English			Psychology		
	CLASSCUT	CREDCUT	COMPCUT	CLASSCUT	CREDCUT	COMPCUT	CLASSCUT	CREDCUT	COMPCUT
A	4.0 (0.943)[b]	0.82 (0.19)	4.3	0.96 (0.80)	0.57 (0.48)	1.2	2.8 (1.1)	0.47 (0.18)	2.6
B	6.4 (1.1)	1.2 (0.21)	5.6	0.62 (0.62)	0.53 (0.53)	1.0	2.8 (1.1)	0.55 (0.21)	2.6
C	6.8 (1.1)	1.0 (0.17)	6.4	1.4 (0.94)	0.68 (0.46)	1.5	3.9 (1.2)	0.68 (0.20)	3.4
D	7.3 (0.91)	1.1 (0.20)	8.0	2.5 (0.58)	0.94 (0.22)	4.3	2.3 (0.72)	1.0 (0.31)	3.2
E	4.0 (0.75)	1.4 (0.26)	5.3	1.3 (0.93)	0.59 (0.42)	1.4	3.6 (1.2)	0.64 (0.21)	3.1
F	6.3 (1.5)	0.88 (0.21)	4.3	1.4 (0.88)	0.46 (0.29)	1.6	3.6 (0.72)	0.65 (0.13)	5.0
G	7.0 (2.2)	1.2 (0.38)	3.2	1.3 (1.7)	0.39 (0.51)	0.77	2.0 (0.87)	0.42 (0.19)	2.3
H	8.7 (0.73)	4.8 (0.40)	12.0	-	-	-	8.2 (0.98)	2.1 (0.25)	8.4
I	8.4 (2.1)	1.3 (0.33)	4.0	2.8 (1.0)	0.92 (0.33)	2.8	5.1 (1.8)	1.5 (0.52)	2.9
J[c]	1.4 (0.82)	0.68 (0.40)	1.7	1.0 (0.93)	0.86	0.92 (0.84)	0.92 (0.38)	0.42	1.1

(a) Costs are in thousands of dollars per 12 month year per graduate student enrolled in a department. (b) The numbers within the parentheses are the ratios of CLASSCUT and CREDCUT to COMPCUT estimated departmental costs. (c) This institution offers the Masters as its highest degree.

5.2 CREDCUT

The CREDCUT procedure (Table 5-1) is based on a widely used quantity known as the student credit hour ("SCH"; see Section 6.2). Here, the departmental cost per SCH is found by dividing the total departmental expenditures by the total number of SCH "generated" by the teaching activities of the departmental faculty. The students in a particular program, such as the Masters program, attend classes, and, thereby, accumulate a certain number of SCH. The departmental cost of this program is estimated by multiplying the total number of SCH generated by the student in the program by the cost of one SCH. The unit cost is obtained by dividing the total cost by the number of students enrolled in the program.

This procedure, like CLASSCUT, offers simplicity as its major advantage, but presents similar difficulties. Thus, it does not take into account the possibly substantially greater time and quality of effort required by professors to prepare and present instruction for graduate compared with undergraduate students. Also, individual instruction of graduate students in thesis and dissertation work is difficult to represent in terms of SCH.

5.3 COMPCUT

The COMPCUT procedure is a composite method based in part on use of a Faculty Activity Analysis ("FAA"; see Section 6.3), in order to quantify, at least approximately, the proportion of time devoted by the faculty in a department to; the offering of formal courses at each of several levels, the carrying out of scholarly work and research, and committee work, etc., and also in part on a Crossover Analysis ("XOA"; see section 6.4), which gives information concerning the SCH "taken" in particular fields and at specified levels by students enrolled in a degree program.

The procedure is outlined in Table 5-1 and described below in some detail. Preliminary study was given to a FAACUT ("FAA") procedure whereby Scholarly Activity costs were allocated based on FAA ascribed to each level, as illustrated in the Supplement. This approach was abandoned in favor of the weighting system embodied in COMPCUT.

The COMPCUT procedure avoids most of the difficulties described for the CLASSCUT and CREDCUT procedures although it is less simple to

carry out. It suffers from three main shortcomings: it relies centrally upon FAA data which are frequently of limited reliability; it draws strongly on SCH data which are sometimes used in dissimilar ways in different departments and institutions, and especially in relation to independent study relative to Masters thesis and Doctors dissertation research; and it may utilize the numbers of graduate students reported to be enrolled in Masters or Doctors programs, and these numbers are often imprecise.

5.4 Comparison of CLASSCUT, CREDCUT and COMPCUT

Major variations are evident in the costs estimated for a particular department by use of different procedures, as is exemplified in Table 5.2. This shows departmental costs per year per graduate student obtained by application of the CLASSCUT, CREDCUT and COMPCUT procedures for a number of departments of Chemistry, English, and Psychology, and also the ratios of CLASSCUT and CREDCUT to COMPCUT estimated costs for individual departments.

CREDCUT costs are seen to be much lower than the other costs, and mainly because the procedure does not recognize the significantly great faculty time which is usually associated with instruction and research at the advanced levels. In our view and that of the Advisory Committee, the CREDCUT procedure does not merit serious consideration as a potentially useful procedure for making estimates of the costs of graduate work.

CLASSCUT costs are sometimes surprisingly close to the COMPCUT costs although major differences still occur in certain cases. The cause of these departures is not clear to us, but possibly is associated with inconsistent allocation of classes to programs, e.g., to a graduate instead of an undergraduate program, or *vice versa*, or else inconsistent FAA reporting. Within a particular institution and with allocations of classes to programs made by well-informed persons, the CLASSCUT procedure may prove to be of value in view of its simplicity.

Generally, the COMPCUT procedure is considered by us to be the most useful of those studied because allocations are made using rationally based estimates of the disposition of expensive faculty time (via FAA) and of student use of resources (via SCH and XOA), and because the procedure may be relatively straight forward and inexpensive to

carry out, as described below in Section 10.5.

6. DEPARTMENTAL COSTS - APPLICATION OF THE COMPCUT PROCEDURE

In the following paragraphs, certain definitions, data sources, and their interrelationships will first be discussed, and the several steps of the COMPCUT procedure will be described. Numerical results are shown on the histograms assembled together following the end of the text of this report and subsequent chapters.

6.1 Numbers of Departmental Faculty Members and Graduate Students

The departments studied vary widely in size in terms of FTE faculty members: English and Mathematics ranged from around ten to more than one hundred; Chemistry, Economics and Psychology from about ten up to around fifty; and Biochemistry from five to about fifteen. The numbers of graduate students associated with the departments studied also varied highly.

The average number of graduate students per FTE faculty ranged from about two to four (Figure 6-1).

Part-time graduate students were found to comprise only up to some ten or twenty percent of the total population in the departments studied when graduate students holding Teaching Assistantship, Research Assistantships, and Fellowships were counted as full-time students. Because of these relatively small percentages, and because of inconsistent definitions and policies relating to full-time equivalent students in different institutions, we have used "head count" numbers of graduate students in most cases as a basis for our estimates of costs, rather than full-time ("FTE") students.

6.2 Levels of Instruction and Student Credit Hours ("SCH")

An eight level system of words and numbers was used in our data-collecting questionnaires (see Supplement) to describe the level or degree of advancement of academic courses.

As the study progressed, it became evident that this system is too detailed, and therefore, some aggregations were made to provide the following five level system: LD = lower division undergraduate; UD = upper division undergraduate; GC = graduate classes;

ISTH = Independent Study, and Masters thesis; and DISS = Doctors dissertation. Data received from participating institutions were translated into this system.

The student credit hour ("SCH") is a unit used in academic record keeping which usually is defined as the "quantity" of instruction offered by a professor and presumed to be received by one student during the period of time over which a particular lecture class is offered, e.g., one academic quarter or semester.

Thus, if a professor meets and lectures to a class for, say, one hour three times per week at an institution where the class offering continues over one academic quarter of the year, or three months, then this activity may be identified as a three-quarter credit hour class, or usually a three-credit hour class. If ten students are enrolled, then 10 x 3 = 30 SCH are "generated" by this class.

Quarter SCH have been multiplied by 0.67 to obtain Semester SCH which are used throughout the following calculations.

The total number of SCH teaching activity reported for each participating department was divided by the number of departmental faculty members to secure the values given in Figure 6-2. Moderately good consistency in SCH per faculty member is found for the LD and UD levels, but only fair, and less than fair, for the ISTH and DISS levels, respectively, as might be expected as a result of the diversity of the departments studied and also the relatively small numbers of graduate credits developed.

In all fields except Biochemistry, the dominant commitment of faculty to teaching at the undergraduate and lower division level is noteworthy.

6.3 The Faculty Activity Analysis ("FAA") and its Relation to Student Credit Hours

The FAA shows the fraction of total working time, as estimated by faculty members and/or departmental chairmen, which the faculty members in a department devote to formal instruction at each of several levels, and to Scholarly Activity ("SA"), committee meetings, and other activities. Forms differ somewhat at different institutions, and information for the present study was collected using the questionnaires shown in the Supplement.

The FAA data collected for each field (Figure 6-3) show fair consistency with respect to the fraction of faculty time on the average devoted to the several instructional levels and other categories, and

the "service" load of lower division undergraduate teaching is indicated to be heavy in Chemistry, English and Mathematics, moderate in Economics and Psychology, and light in Biochemistry. Variances are higher among the smaller percentages associated with GC, ISTH, and DISS levels, as may be expected. Again, one sees a major commitment by the several faculties to undergraduate teaching. Scholarly activity is a significant element in all fields.

A relationship between the reported faculty teaching activity and SCH was obtained by dividing the proportion of faculty teaching time devoted to instruction at a particular level, i.e.,

(FAA for level/FAA for total teaching)

by the proportion of SCH generated at that level, i.e.,

(SCH for level/SCH total)

to secure a ratio, "R" (Figure 6-4).

The average values of R increase progressively in all fields for the LD, UD, GC and ISTH categories, but sometimes not for the DISS category, and thus indicating a major increase of faculty time associated with one credit hour as the level of instruction becomes more advanced.

For fields other than Mathematics and Psychology, values of R for DISS are substantially less than for ISTH, GC and sometimes even UD. These variations are believed to arise mainly as a result of differences in policies and practices among the several subject fields and institutions with respect to DISS enrollments and SCH equivalencies, and to inconsistencies in assigning faculty time among the categories of DISS instruction, Scholarly Activity, and sponsored research activity. Generally, in the opinion of the authors, the true values of R for the DISS category in most cases are equal to or greater than those shown in Figure 6-4 for the ISTH category. The substantial variance found in R, as indicated by the spread of the quartiles for a particular category, emphasizes the primary shortcoming of the COMPCUT method for comparisons among fields and/or institutions in that it relies primarily on the validity and consistency of the FAA in allocation of departmental costs by level of instruction.

6.4 The Crossover Analysis ("XOA") and Parent- vs. Extra-Departmental SCH

Graduate students in a particular field often receive formal instruction in classes offered by professors associated with departments other

than their "parent" department. Expenditures to provide for these extra-departmental courses must be considered as elements of graduate degree program costs.

To present information concerning the nature and extent of inter- and intra-departmental instruction, use is frequently made of a tabulation know as a Crossover Analysis ("XOA"). This is a compilation, usually computer-generated, prepared by assembling data from the records of all individual students enrolled in a particular program, such as an English Ph.D. program. The XOA shows the total SCH by specific academic field, and/or academic area, and by level, taken during a specific quarter or semester by all of the students enrolled in the subject program.

In the present study, a questionnaire shown in the Supplement was used to collect a limited amount of XOA data. This consisted of the total number of SCH taken by the average Masters and Doctors students in a particular program, and also, for intra- and extra-departmental courses separately, the number of SCH taken at each of the five levels of instruction. Thus, extra-departmental courses were not identified by specific field or area, but only as courses taken outside the parent department.

Compilation of the data received showed, in most cases, that more than eighty and sometimes nearly ninety percent of the average Masters and Doctors program SCH are taken within the parent department (Figures 6-5, 6-6).

Thus, one may make use of parent department SCH costs to approximate SCH costs for all courses taken by departmental graduate students as is described below.

From the collected XOA data, the total and by-level numbers of SCH taken in a semester per graduate student in a particular program have also been compiled for Masters (Figure 6-7) and for Doctors (Figure 6-8) students. Masters students on the average sometimes take more total credits per semester than Doctors students, a fact of some significance in estimating unit departmental costs for Doctors versus Masters students, on a head count basis. Variations are especially high for DISS SCH and ISTH SCH, reflecting the differing policies and practices of the responding departments.

6.5 The Departmental Budget (unrestricted funds)

To compare the major elements of the budgets of the departments studied, the total budgeted expenditures, and those for the categories of faculty compensation, staff compensation, T.A. compensation, and "other," were divided by the total numbers of full time equivalent faculty members in the department, and the resulting averages have been calculated for the several fields studied (Figure 6-9).

Total departmental expenditures averaged about $25,000 per faculty member in all fields.

Faculty compensation is the most important cost in all fields and may comprise sixty to eighty percent of the total departmental expenditures. Total expenditures for personnel often exceeds ninety percent of the departmental budget.

6.6 Departmental Costs by Level of Instruction (COMPCUT Step 1)

To estimate departmental costs for each level of instruction, departmental budgeted expenditures have been grouped into five categories: faculty compensation, staff compensation, Teaching Assistant compensation, Research Assistant and Post Doctoral appointee compensation, and operations. Costs in each of these categories, with two exceptions, have been assigned to levels of formal instruction in accord with the fraction ("F") of time devoted by the faculty to formal teaching, i.e.,

(FAA for level/FAA for total teaching)

as indicated by the FAA (Figure 6-3).

One exception is Teaching Assistantship costs: these have been assigned to lower and upper division undergraduate work in the arbitrary proportions of 80% and 20%, respectively. However, for a particular department, some other distribution might be appropriate.

The other exception is the allocation of the costs of faculty time devoted to Scholarly Activity. The question is: how should Scholarly Activity costs be apportioned to the several levels of formal instruction, since we presume that these costs should be recognized as elements of the costs of instruction?

One might propose that Scholarly Activity costs should be distributed uniformly to each level of instruction, or else uniformly by FAA and this approach was considered as part of the FAACUT procedure (see Supplement).

However, we came to the conclusion that the cost of faculty time devoted to Scholarly Activity should be assessed more heavily on the advanced levels of instruction because of the increased requirement that professors keep up-to-date in their scholarly field as their teaching is offered at the more advanced levels. This relationship as suggested by the R values of Figure 6-4 and is particularly significant for graduate work where current research publications must be read, understood, evaluated, and incorporated into formal teaching, and guidance in research activity must must be given to graduate students who are working on their Masters theses and Doctors dissertations.

We conferred with Advisory Committee members whose comments to our allocation of Scholarly Activity costs to the several levels of formal instruction with weighting factors in which the "quantity" of faculty time represented by a FAA percentage is weighted by a quantity factor as follows: Lower Division undergraduate courses, weighting factor = 1; Upper Division undergraduates, 3; Graduate Classes and Independent Study and Research, 5; Masters Thesis, 7; and Doctors dissertation, 10.

Based on these considerations, total departmental costs by level of instruction were obtained by taking the sums of the above-discussed three elements.

We recognize that graduate students incur instructional costs by taking courses outside their parent department. However, for simplicity we have estimated departmental costs by the above-stated procedure assuming that SCH costs at each level are approximately the same in outside as in parent departments. This assumption is believed to introduce relatively little error; because the percentages of non-parent department SCH relative to the total SCH taken by graduate students are relatively small (Figures 6-5 and 6-6); because the difference but not the absolute value of SCH cost is dealt with; and because graduate students often take the less expensive undergraduate courses outside their parent department.

6.7 Department SCH Costs by Level of Instruction (COMPCUT Step 2)

The total departmental cost as estimated above for each level of instruction was divided by the total number of SCH provided by the departmental faculty at that level to yield the departmental cost per SCH by level, and these costs are described in Figure 6-10.

Average costs per SCH increase progressively as the level of instruction increases, except for the cases of DISS SCH for Biochemistry, Chemistry, Economics and English. These departures, we believe, result from anomalies in FAA reporting of DISS activities as pointed out above in Section 6.3.

6.8 Total Annual Departmental Costs of Graduate Programs (COMPCUT Step 3, and COMPCUT-MD)

To estimate the total annual departmental cost of a particular program, the number of SCH at each level taken during a particular quarter or semester by the total students enrolled in the subject program, was multiplied by the cost per SCH at each level, respectively. The several products were added to obtain the costs for one quarter or semester, and appropriate further multiplication then yielded the estimated annual cost of the program. These costs for a particular field varied widely because of the different numbers of faculty members and graduate students in the several reporting departments. Thus unit costs were calculated as described below.

As an alternative to the above-described procedure based upon use of parent department SCH cost only, it is possible and desirable to make estimates of total annual departmental costs of graduate programs based on multi-departmental data ("COMPCUT-MD") provided sufficient information is available.

To this end, the XOA can be employed to construct a listing of the courses (e.g., by field, level, and number of SCH) taken during a specific term by all students enrolled in a particular program. To simplify matters, academic fields can be grouped into a small number of areas for which SCH costs are similar and available by such procedures as already described. By taking the sum of the products obtained by multiplying the costs per SCH appropriately with the numbers of SCH taken in each field or area and at each level, the total departmental graduate program costs can be obtained. Such multiple department unit cost estimates probably will approximate actual costs more closely than single department unit costs, but insufficient XOA data was available to permit such calculations to be made within the present study.

6.9 Annual Departmental Costs per Graduate Student (COMPCUT Step 4A)

The total annual departmental cost estimated for each graduate program was divided by the head count number of graduate students enrolled

in the subject program to obtain our approximation of the annual departmental cost per enrolled Masters and Doctors student, (Figure 6-11).

Here and in the above text, it should be noted that program average unit costs are discussed, and these are obtained by summing the individual program unit costs and dividing by the number of programs studied, e.g., for English-Ph.D. programs in departments A, B, C --

$$\frac{[\text{Unit Cost}]_A + [\text{Unit Cost}]_B + [\text{Unit Cost}]_C + --}{\text{Total number of programs studied}} = \text{program average unit cost}$$

and this procedure gives equal weight to the estimated unit costs for each program studied, large or small.

To permit comparison, we have also calculated student average unit costs (Figures 6-12) by weighting the unit costs estimated for a particular departmental program by a fraction which is the number of students enrolled in the subject departmental program divided by the total number of students enrolled in all the programs studied in a particular field, i.e.

$$\frac{[\text{Unit Cost}]_A [N_A] + [\text{Unit Cost}]_B [N_B] + [\text{Unit Cost}]_C [N_C] + --}{N=\text{Total number students enrolled in program studied}} = \text{student average unit cost}$$

and this procedure gives equal weight to the estimated unit cost for each student enrolled in the programs studied.

Generally, the student average estimated unit costs are lower than the program averages because the former weights programs more heavily as the number of enrollees increases to levels where lower unit costs tend to be obtained as a result of economies of scale.

Estimated costs per enrolled graduate student are given in Figures 13 and 14.

Unit costs estimated on a head count basis in some cases turn out

to be not much different for Masters compared with Doctors students, and this result is obtained in part because the average number of SCH taken per semester by a Masters student is sometimes higher than the number taken by a Doctors student. As an alternative basis for estimating unit costs, consideration was given to use of a "full time equivalent" student defined in terms of ten SCH, but this did not seem appropriate in view of the wide variance found within a field among responding departments in the numbers of SCH actually taken by enrolled students.

6.10 Departmental Costs per Awarded Degree (COMPCUT Step 4B)

The total annual departmental cost estimated for each graduate program was divided by the five year average number of degrees awarded in the subject program to obtain our approximation of the departmental cost per awarded Masters or Doctors degree. For each field studied, program average and student average unit costs were obtained by the methods described in Section 6.9, and results are shown in Figures 6-15 and 6-16, respectively. Biochemistry Master degree costs are anomalous because only a very small number of Masters degrees are awarded.

Since several years of advanced study are required for completion of the Doctors degree, the unit cost per Doctors degree is several times the annual cost per year. By dividing the estimated cost per Doctors degree by the estimated annual cost, one might try to approximate the number of years beyond the first year of graduate work on the average which are needed to complete a degree. However, such a figure would be unreliable because account is not taken of students who "drop out" along the way toward completion of their degree.

For the Masters degree, the situation is more complicated because, in addition to the drop out effect, in some fields and at some institutions, students working toward a Doctors degree do not take the Masters degree enroute.

For certain broad areas, estimates have been published by the National Science Foundation[13] of the average number of years needed to complete Ph.D. degrees, and the "survival rate" of students who begin the program. Such data might be used on a very approximate basis to relate the estimated average cost per degree to the average cost per enrolled student.

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(13) "Projections of Degrees and Enrollments in Science and Engineering Fields to 1985," NSF Report 76-301, by Naomi A. Sulkin, National Science Foundation, Washington, D.C., December (1975).

6.11 Departmental Cost Estimates by Use of a Typical Program ("COMPCUT-TP")

If XOA data are not available, an estimate of departmental cost per awarded degree can be made based upon a compilation of SCH information, by field and by level, relating to the courses completed by the typical graduate student who proceeds through a particular program (COMPCUT-TP). The needed typical program information is obtained by reviewing a number of transcripts of the academic records of graduate students who have completed the subject program, or else by consultation with the appropriate department chairman or a knowledgeable faculty member. The comparison of XOA and TP data for SCH in Masters and Doctors programs (Figures 6-17 and 6-18) show fair agreement between typical and actual SCH associated with individual graduate degree programs. The estimated departmental cost per awarded degree is the sum of the numbers of SCH earned multiplied by the appropriate costs per SCH at each level.

To estimate annual departmental costs per enrollee, the awarded degree cost may be multiplied by the ratio of the average SCH taken in one year to the total SCH taken to complete the degree program, and then this figure is adjusted to take account of the enrolled graduate students who do not complete degrees.

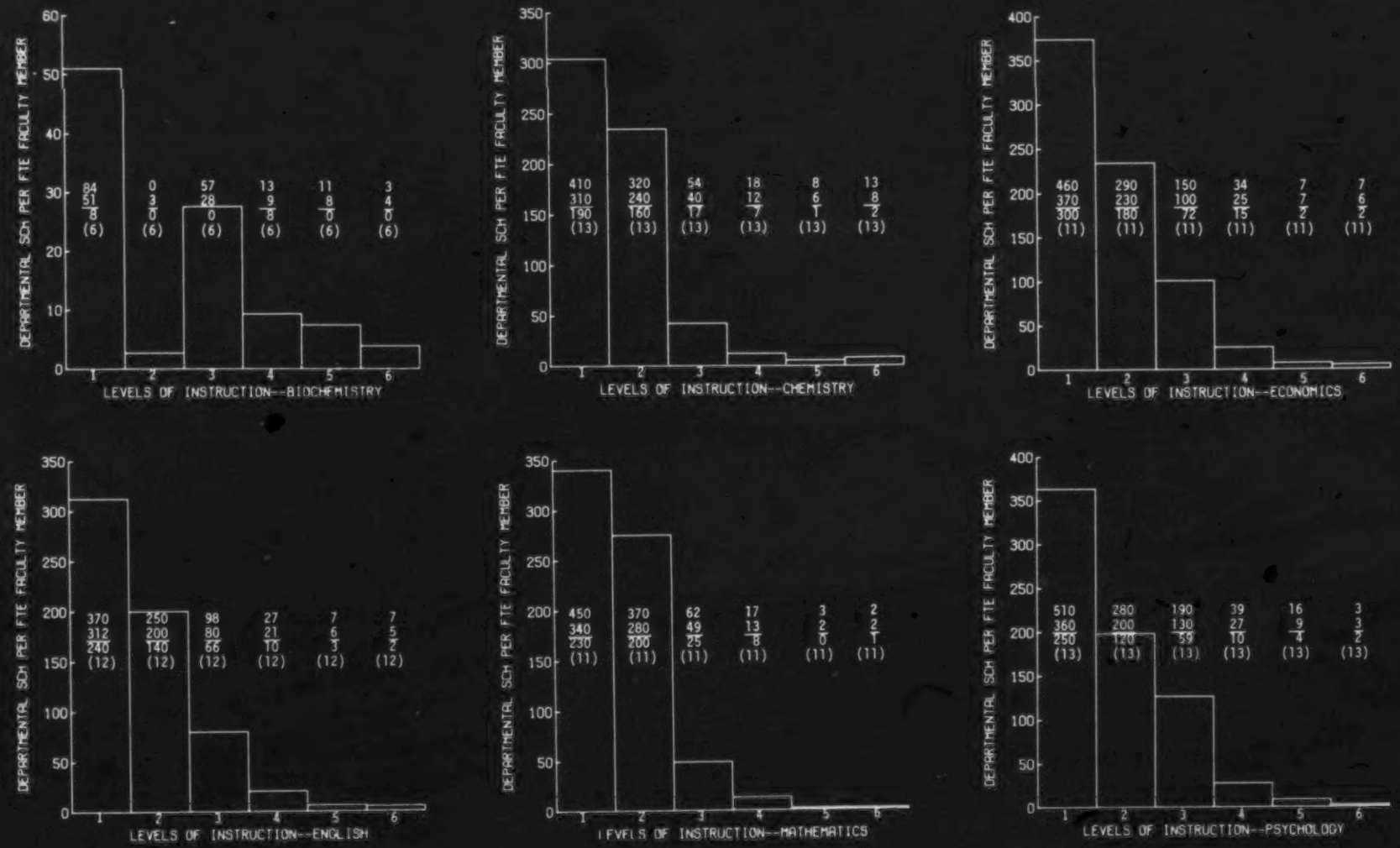
Application of the COMPCUT-TP procedure should provide "closure" on an approximate basis for the total of the academic programs of an institution if applied in a similar manner throughout the college or university.

6.12 Departmental Cost Estimates for Cell Biology- an Interdisciplinary and Non-Departmentalized Field (COMPCUT-TP)

Cell Biology was selected as one of the fields to be investigated in the present study because considerable research and doctoral dissertation work is being done in this field, and because Cell Biology at most universities functions as an interdisciplinary non-departmentalized field. Thus, no departmental budget exists which may be allocated as described above.

The COMPCUT-TP procedure has been applied to Cell Biology to illustrate how graduate program costs might be estimated for an interdisciplinary and non-departmentalized field.

Typical programs taken by students completing Ph.D. degrees with dissertations identified as being in the field of Cell Biology were



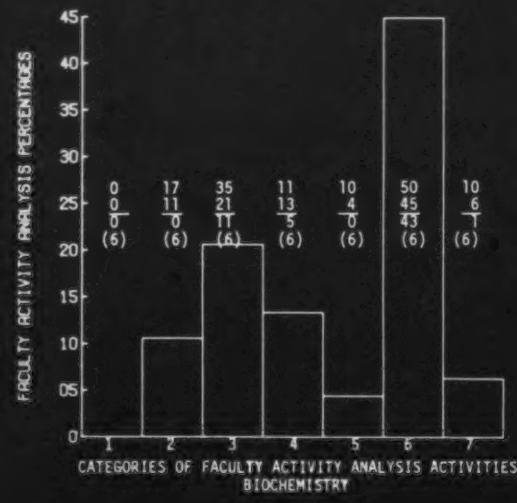
40

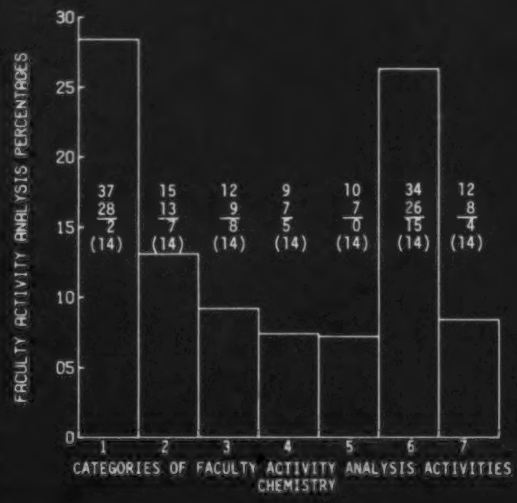
41

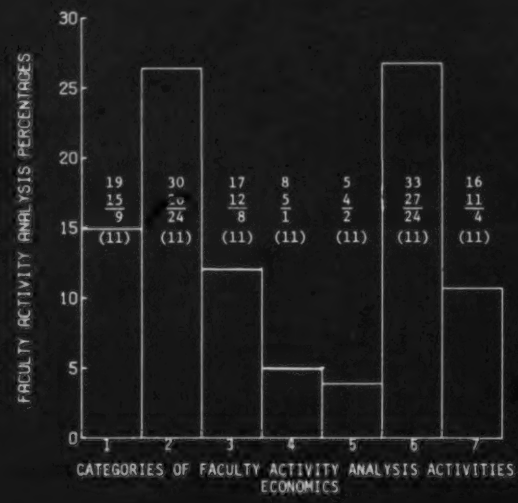
FIGURE 6-2: DEPARTMENTAL STUDENT CREDIT HOURS PER FACULTY MEMBER

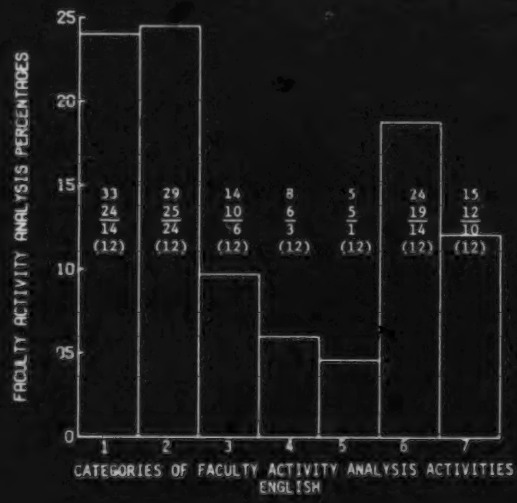
1 = TOTAL 2 = LOWER DIVISION 3 = UPPER DIVISION 4 = GRADUATE CLASSES

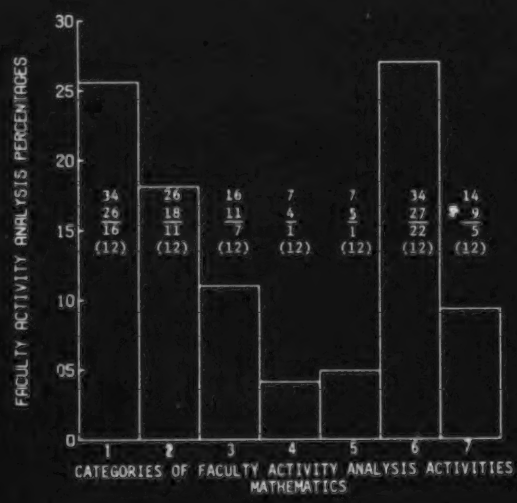
5 = INDEPENDENT STUDY AND THESIS 6 = DISSERTATION


FACULTY ACTIVITY ANALYSIS PERCENTAGES
0 0 0 (6)
17 11 0 (6)
35 21 11 (6)
11 13 5 (6)
10 4 0 (6)
50 45 43 (6)
10 6 1 (6)
1 2 3 4 5 6 7
CATEGORIES OF FACULTY ACTIVITY ANALYSIS ACTIVITIES
BIOCHEMISTRY


FACULTY ACTIVITY ANALYSIS PERCENTAGES
37 28 2 (14)
15 13 7 (14)
12 9 8 (14)
9 7 5 (14)
10 7 0 (14)
34 26 15 (14)
12 8 4 (14)
1 2 3 4 5 6 7
CATEGORIES OF FACULTY ACTIVITY ANALYSIS ACTIVITIES
CHEMISTRY


FACULTY ACTIVITY ANALYSIS PERCENTAGES
19 15 9 (11)
30 26 24 (11)
17 12 8 (11)
8 5 1 (11)
5 4 2 (11)
33 27 24 (11)
16 11 4 (11)
1 2 3 4 5 6 7
CATEGORIES OF FACULTY ACTIVITY ANALYSIS ACTIVITIES
ECONOMICS


FACULTY ACTIVITY ANALYSIS PERCENTAGES
33 24 14 (12)
29 25 24 (12)
14 10 6 (12)
8 6 3 (12)
5 5 1 (12)
24 19 14 (12)
15 12 10 (12)
1 2 3 4 5 6 7
CATEGORIES OF FACULTY ACTIVITY ANALYSIS ACTIVITIES
ENGLISH


FACULTY ACTIVITY ANALYSIS PERCENTAGES
34 26 16 (12)
26 18 11 (12)
16 11 7 (12)
7 4 1 (12)
7 5 1 (12)
34 27 22 (12)
14 9 5 (12)
1 2 3 4 5 6 7
CATEGORIES OF FACULTY ACTIVITY ANALYSIS ACTIVITIES
MATHEMATICS

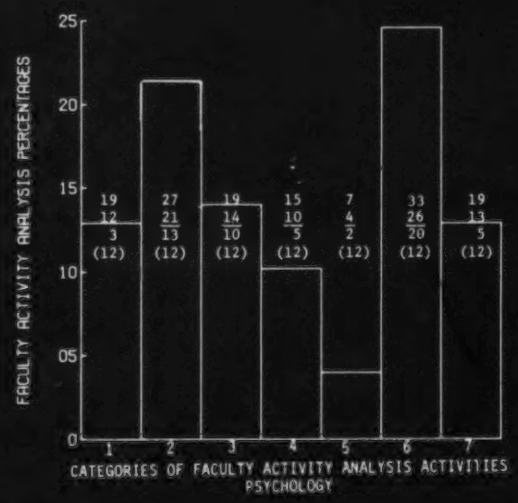
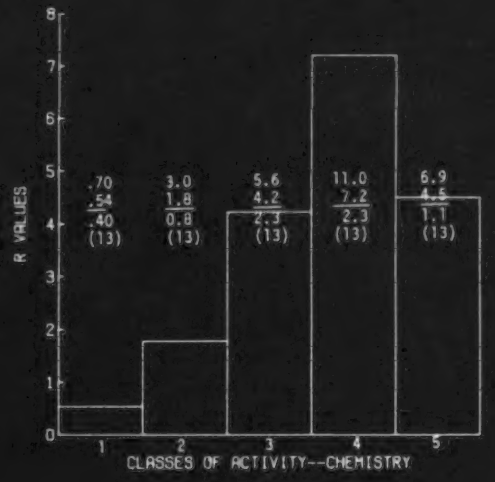
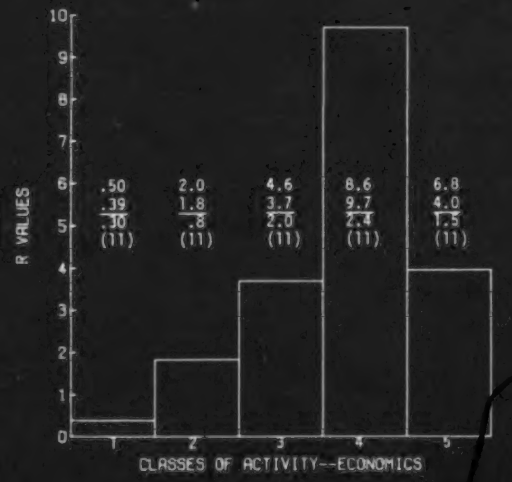
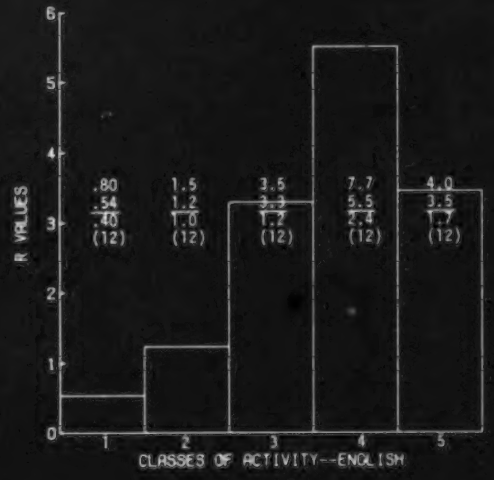

FACULTY ACTIVITY ANALYSIS PERCENTAGES
19 12 3 (12)
27 21 13 (12)
19 14 10 (12)
15 10 5 (12)
7 4 2 (12)
33 26 20 (12)
19 13 5 (12)
1 2 3 4 5 6 7
CATEGORIES OF FACULTY ACTIVITY ANALYSIS ACTIVITIES
PSYCHOLOGY

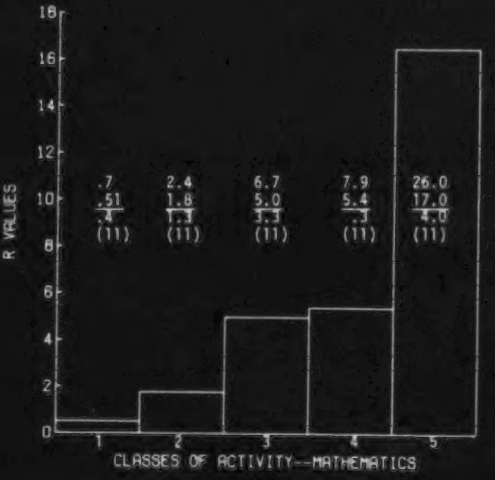
FIGURE 6-3: FACULTY ACTIVITY ANALYSIS PERCENTAGES

1 = LOWER DIVISION 2 = UPPER DIVISION 3 = GRADUATE CLASSES
4 = INDEPENDENT STUDY AND THESIS 5 = DISSERTATION
6 = SCHOLARLY ACTIVITY 7 = OTHER









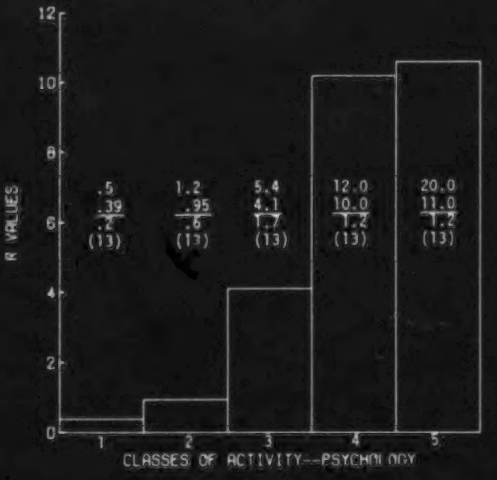


FIGURE 6-4: RATIO ("R") OF PROPORTION OF REPORTED FACULTY TEACHING TIME TO PROPORTION OF STUDENT CREDIT HOURS GENERATED AT A PARTICULAR LEVEL

1 = LOWER DIVISION 2 = UPPER DIVISION 3 = GRADUATE CLASSES

4 = INDEPENDENT STUDY AND THESIS 5 = DISSERTATION

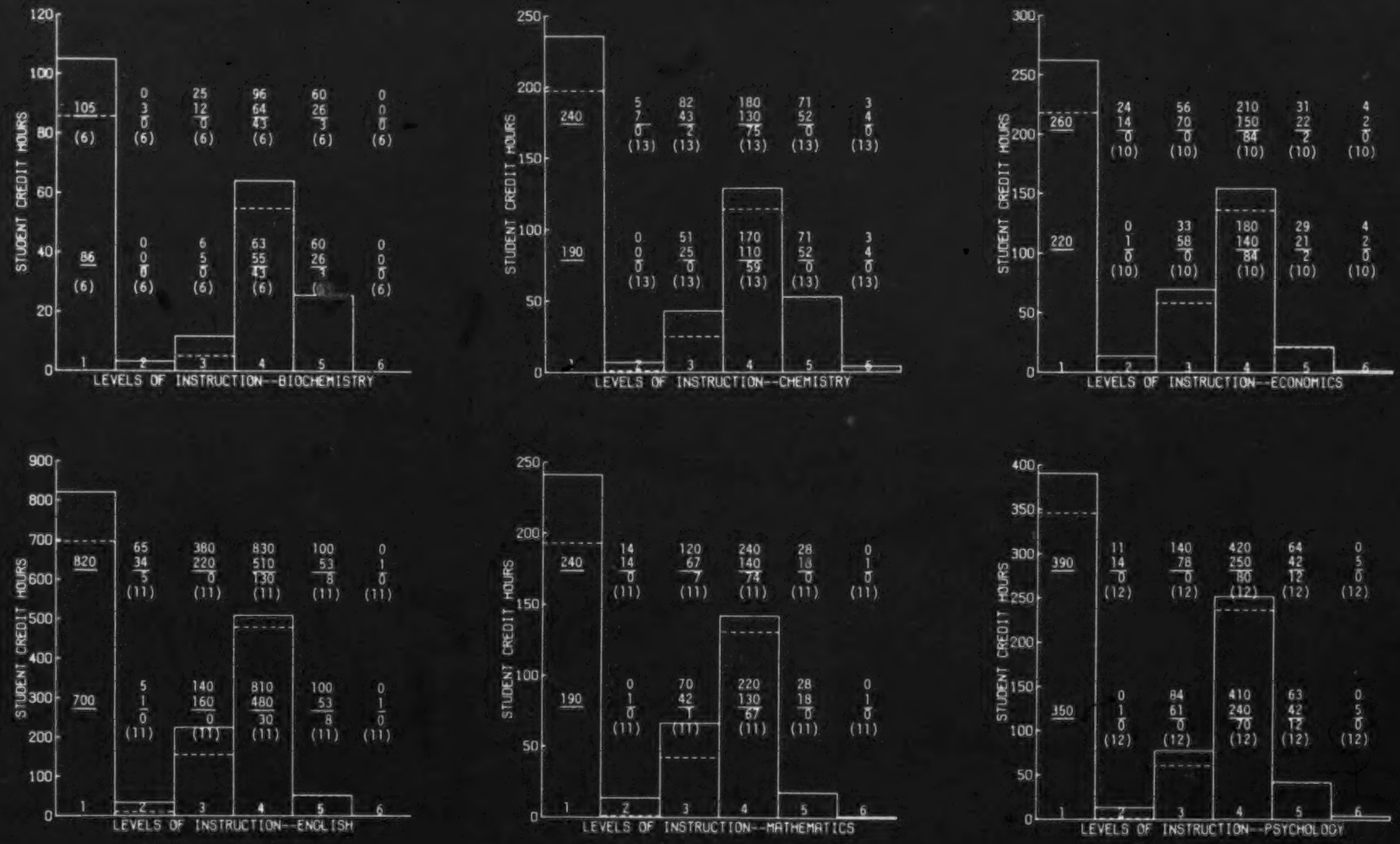


FIGURE 6-5: TOTAL AND PARENT DEPARTMENT STUDENT CREDIT HOURS - MASTERS PROGRAMS

1 = TOTAL 2 = UPPER DIVISION 3 = UPPER DIVISION 4 = GRADUATE CLASSES
5 = INDEPENDENT STUDY AND THESIS 6 = DISSERTATION
(—— TOTAL SCH; ----- PARENT DEPARTMENT SCH)

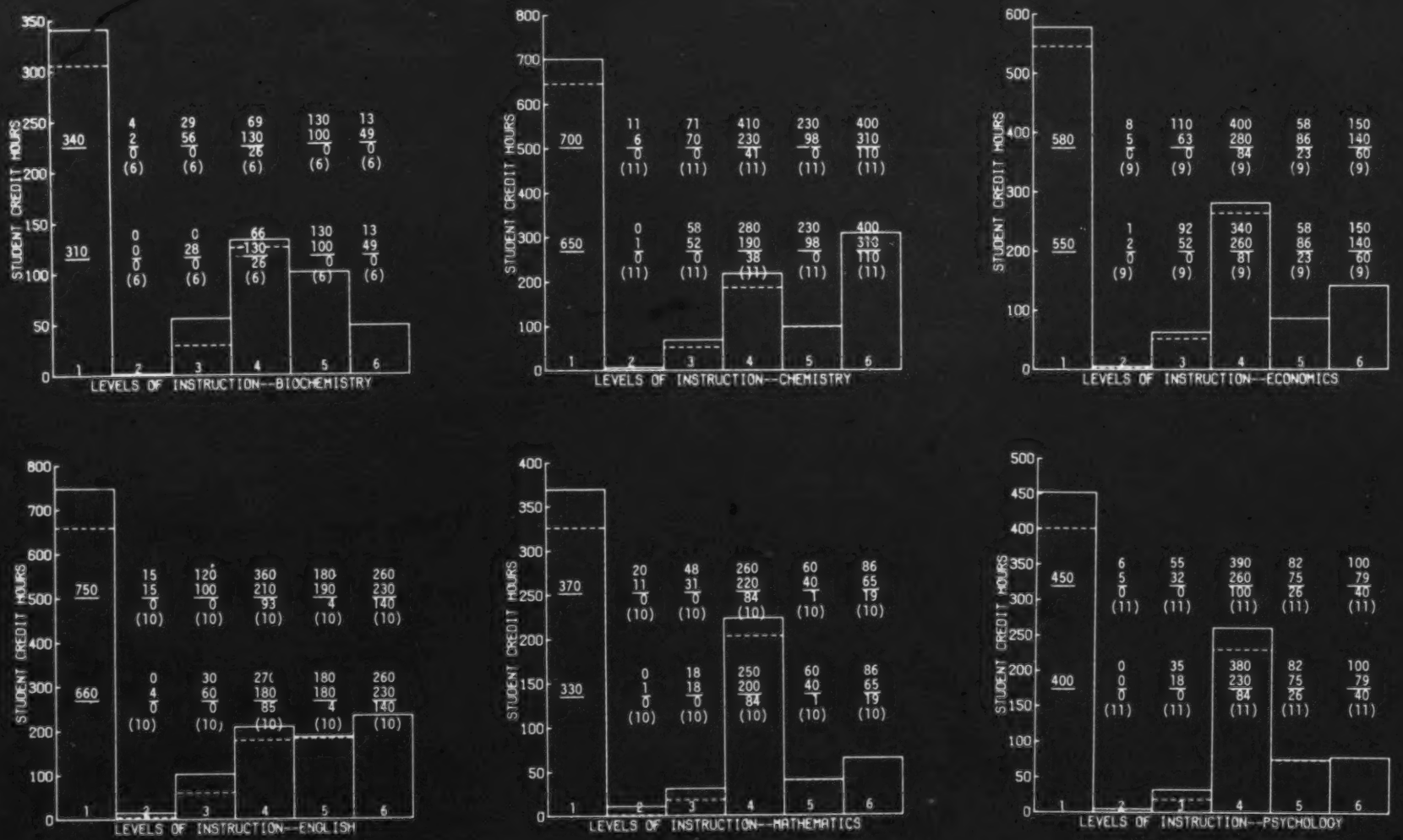


FIGURE 6-6: TOTAL AND PARENT DEPARTMENT STUDENT CREDIT HOURS - DOCTORS PROGRAMS

1 = TOTAL 2 = UPPER DIVISION 3 = UPPER DIVISION 4 = GRADUATE CLASSES
5 = INDEPENDENT STUDY AND THESIS 6 = DISSERTATION
(—— TOTAL SCH; ----- PARENT DEPARTMENT SCH)

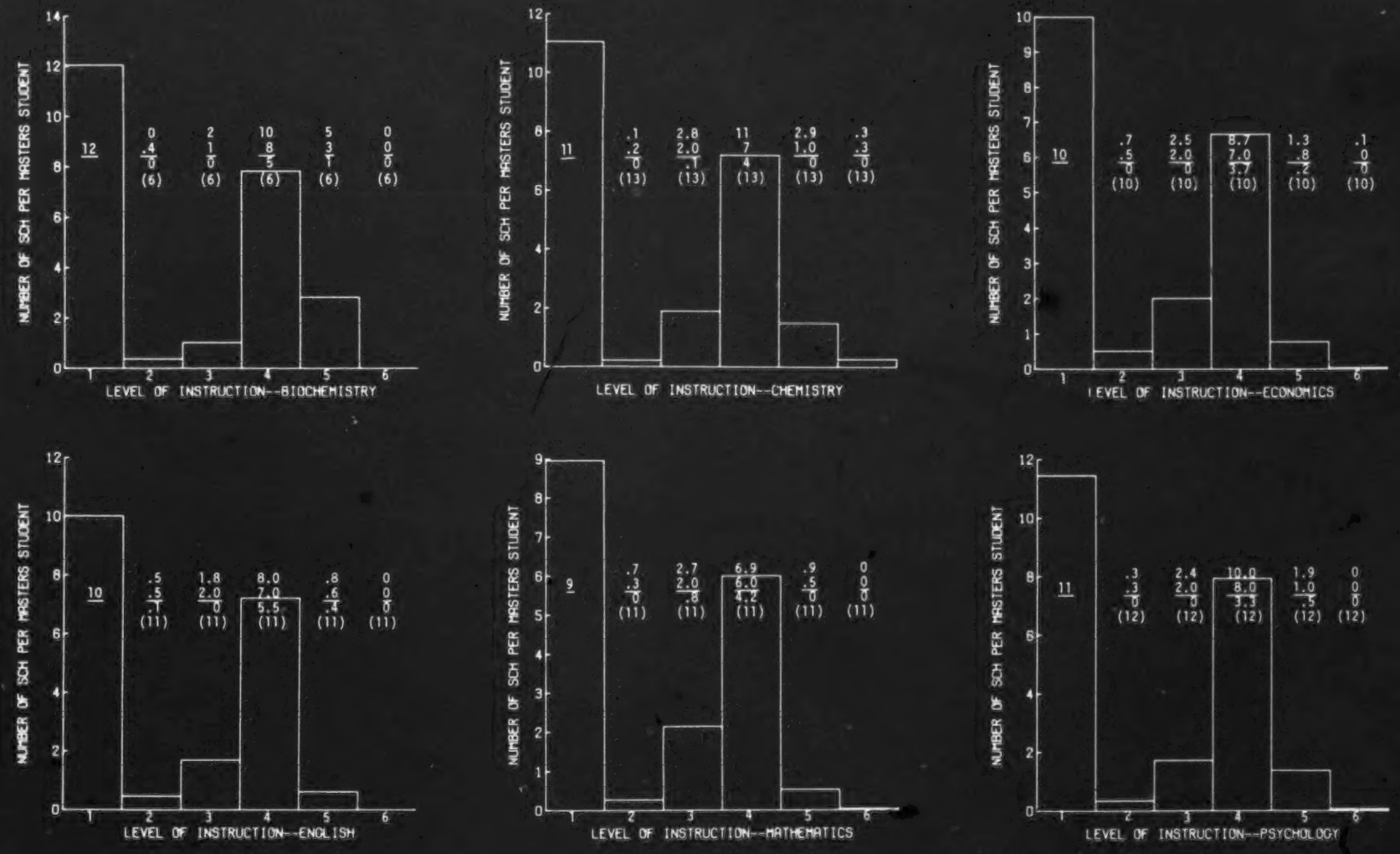
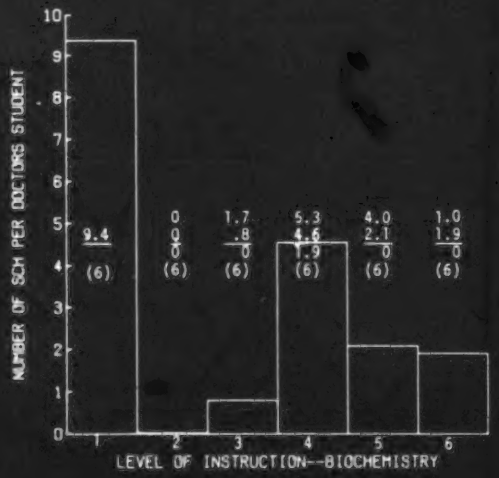
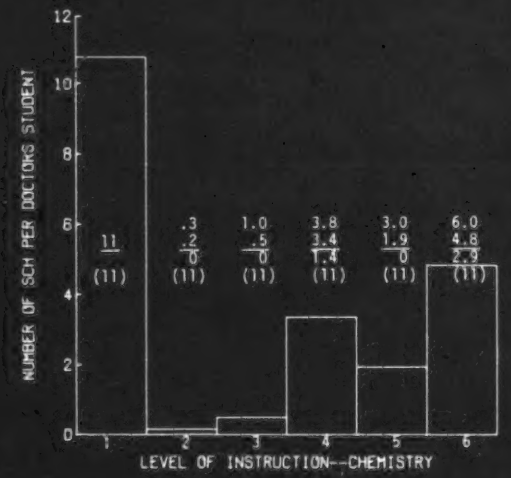


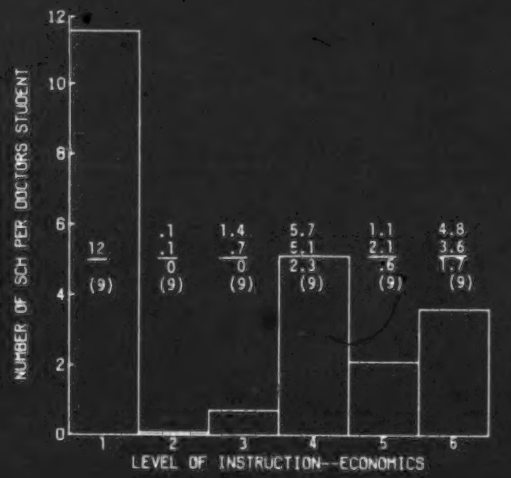
FIGURE 6-7: NUMBER OF STUDENT CREDIT HOURS BY LEVEL - MASTERS PROGRAMS

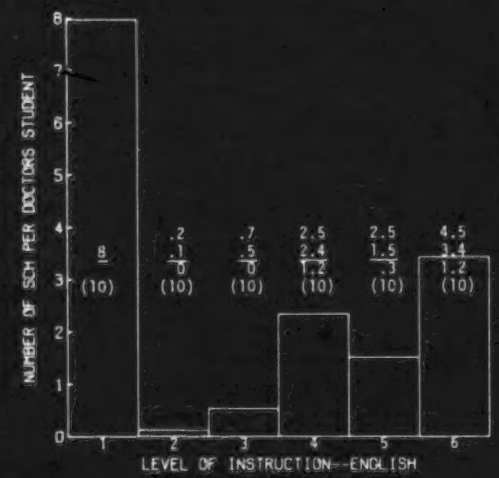
1 = TOTAL 2 = LOWER DIVISION 3 = UPPER DIVISION 4 = GRADUATE CLASSES

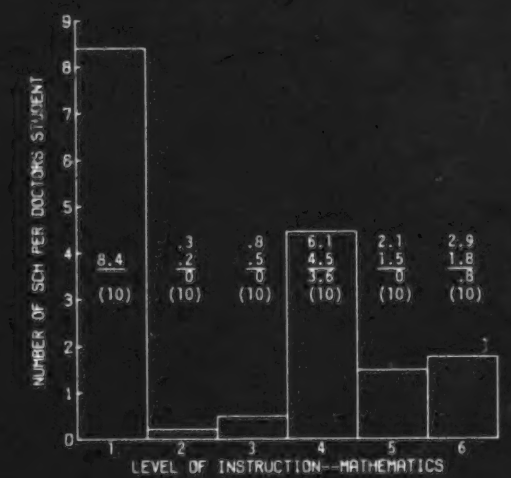
5 = INDEPENDENT STUDY AND THESIS 6 = DISSERTATION

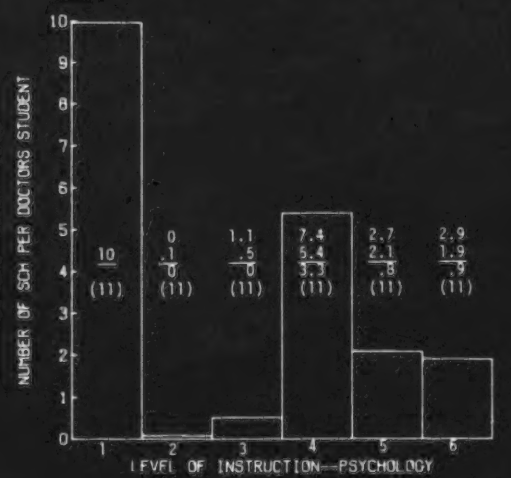












52

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FIGURE 6-8: NUMBER OF STUDENT CREDIT HOURS BY LEVEL - DOCTORS PROGRAMS

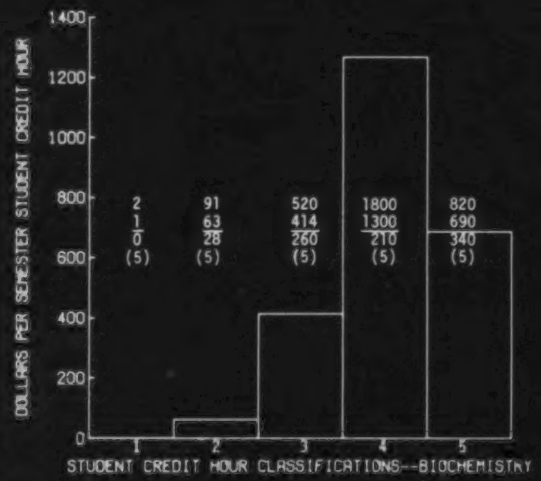
1 = TOTAL 2 = LOWER DIVISION 3 = UPPER DIVISION 4 = GRADUATE CLASSES

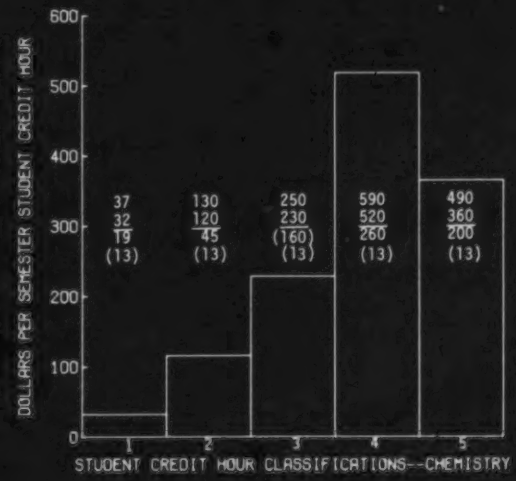
5 = INDEPENDENT STUDY AND THESIS 6 = DISSERTATION

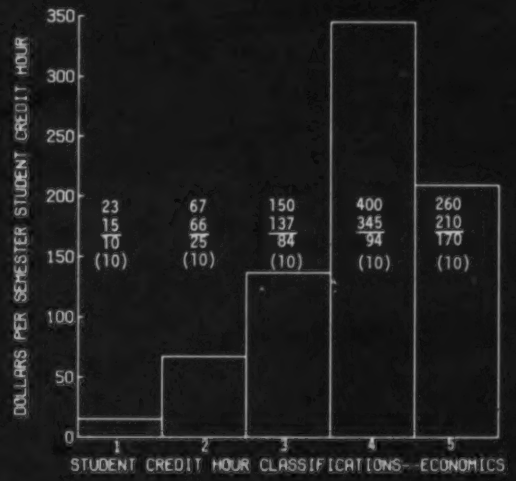
34

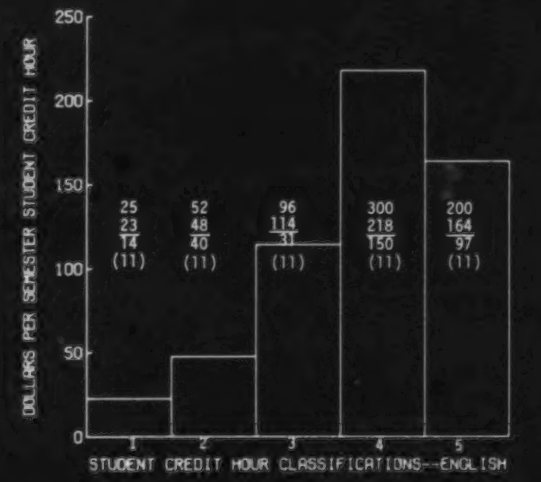
FIGURE 6-9: DEPARTMENTAL EXPENDITURES PER FACULTY MEMBER PER YEAR

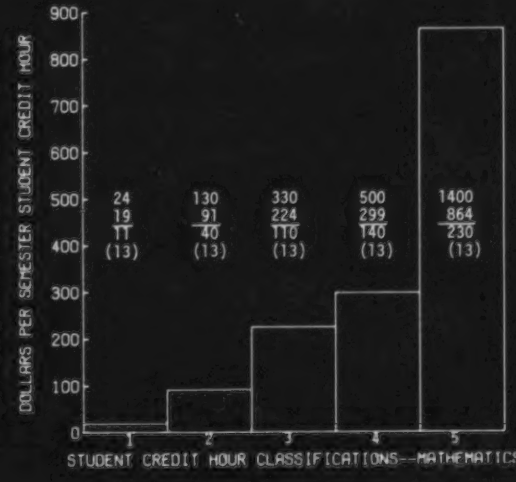
1 = TOTAL 2 = FACULTY 3 = STAFF 4 = TEACHING ASSISTANTS 5 = OTHER











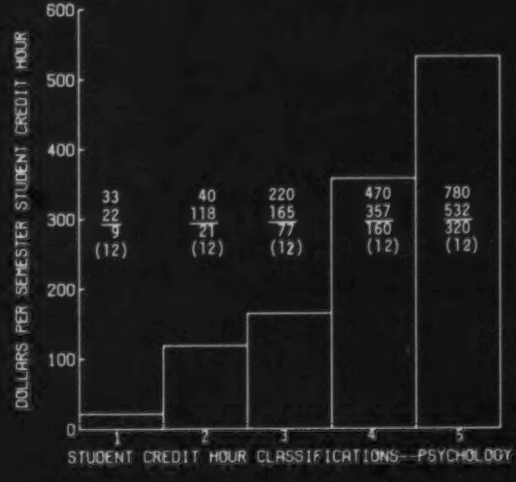


FIGURE 6-10: DEPARTMENTAL COSTS PER STUDENT CREDIT HOUR BY LEVEL

1 = LOWER DIVISION 2 = UPPER DIVISION 3 = GRADUATE CLASSES

4 = INDEPENDENT STUDY AND THESIS 5 = DISSERTATION

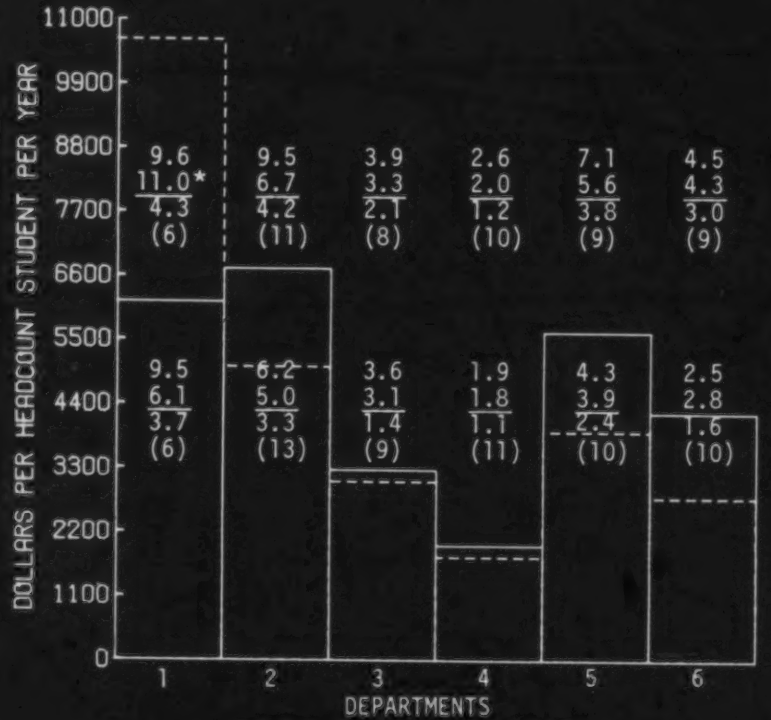


FIGURE 6-11 PROGRAM AVERAGE

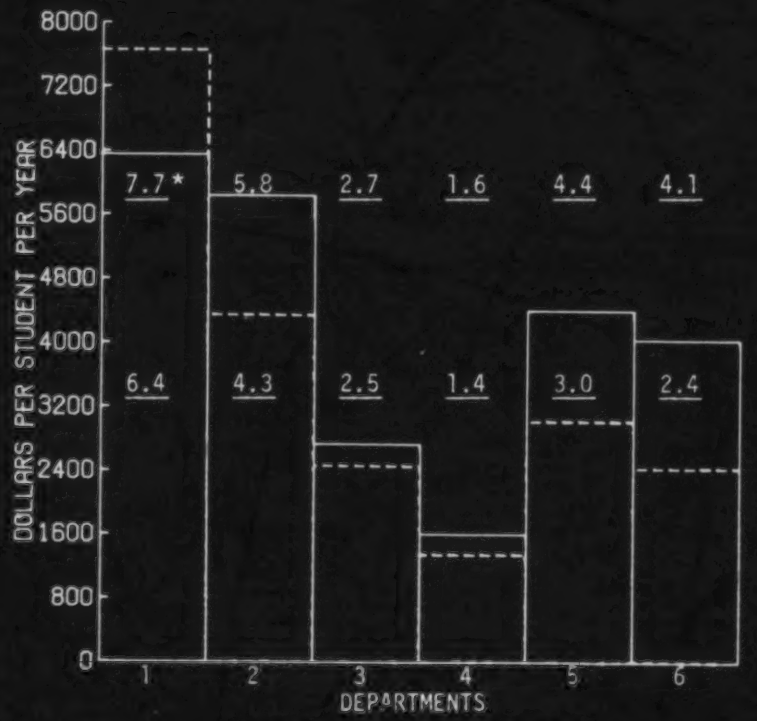


FIGURE 6-12 STUDENT AVERAGE

FIGURES 6-11 AND 6-12: DEPARTMENTAL COSTS BY FIELD PER MASTERS AND DOCTORS STUDENT PER YEAR

1 = BIOCHEMISTRY 2 = CHEMISTRY 3 = ECONOMICS 4 = ENGLISH 5 = MATHEMATICS 6 = PSYCHOLOGY

(——— DOCTORS; ----- MASTERS) (*Thousands of Dollars)

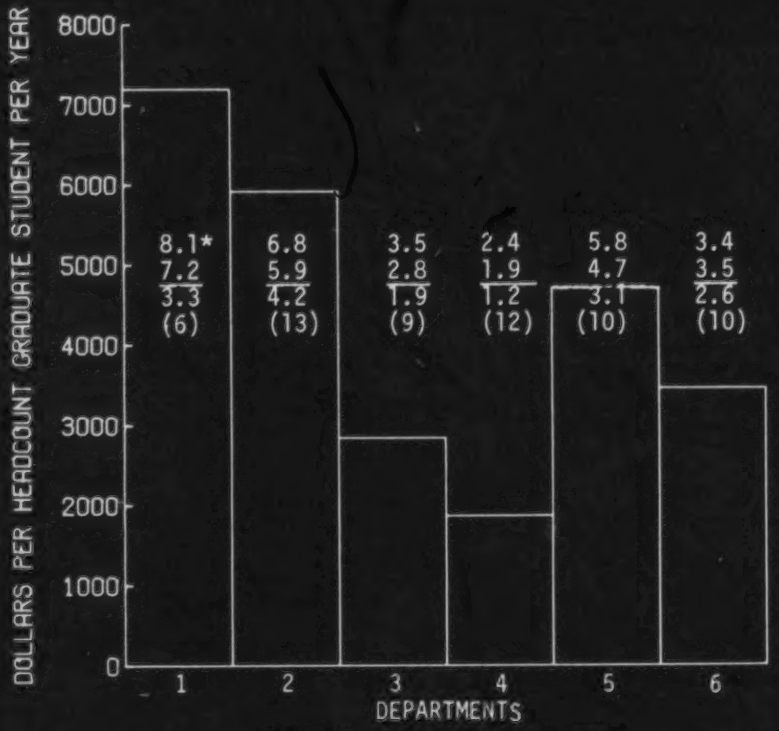


FIGURE 6-13 PROGRAM AVERAGE

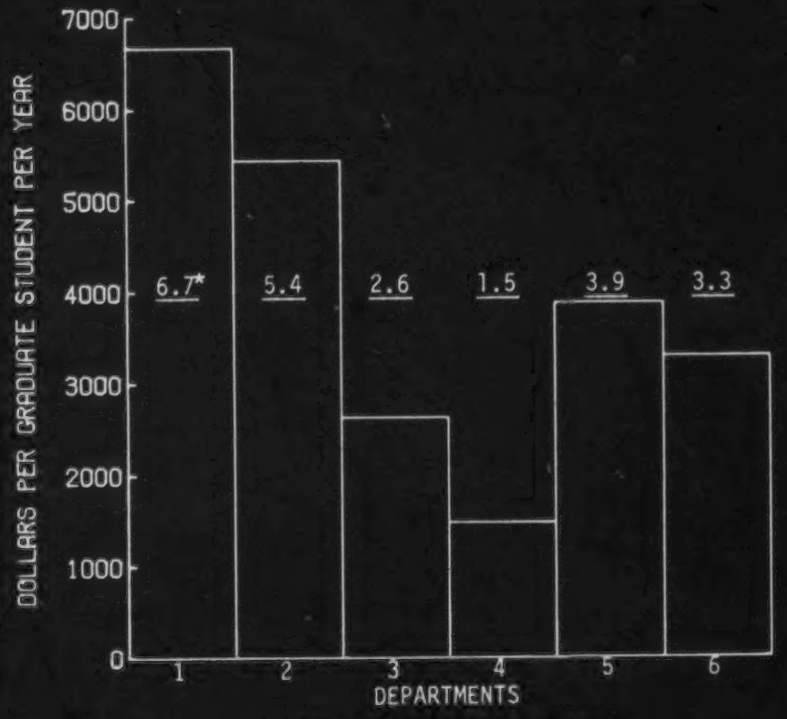


FIGURE 6-14 STUDENT AVERAGE

FIGURES 6-13 AND 6-14: DEPARTMENTAL COSTS BY FIELD PER STUDENT PER YEAR

1 = BIOCHEMISTRY 2 = CHEMISTRY 3 = ECONOMICS 4 = ENGLISH 5 = MATHEMATICS

6 = PSYCHOLOGY (—— GRADUATE STUDENTS) (*Thousands of Dollars)

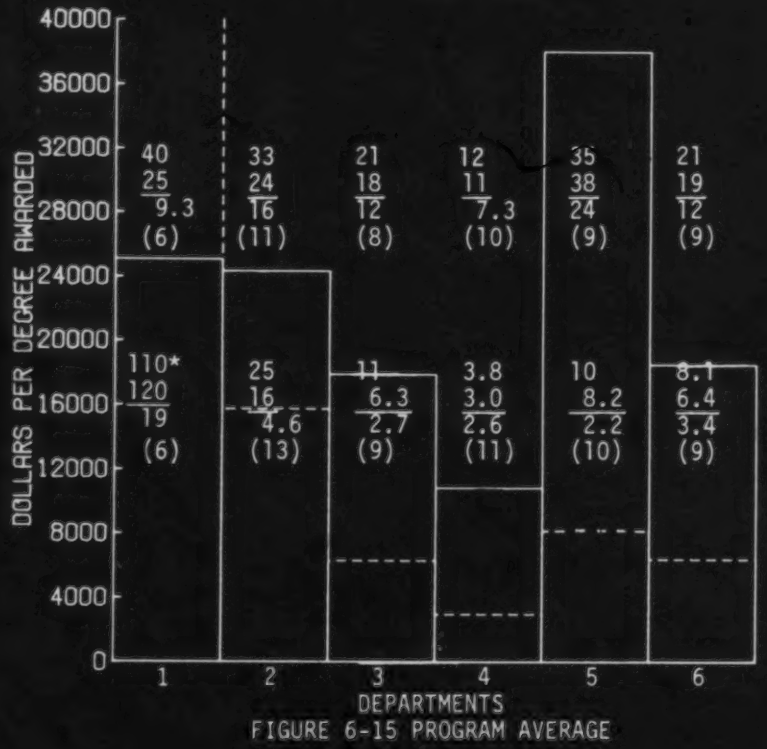


FIGURE 6-15 PROGRAM AVERAGE

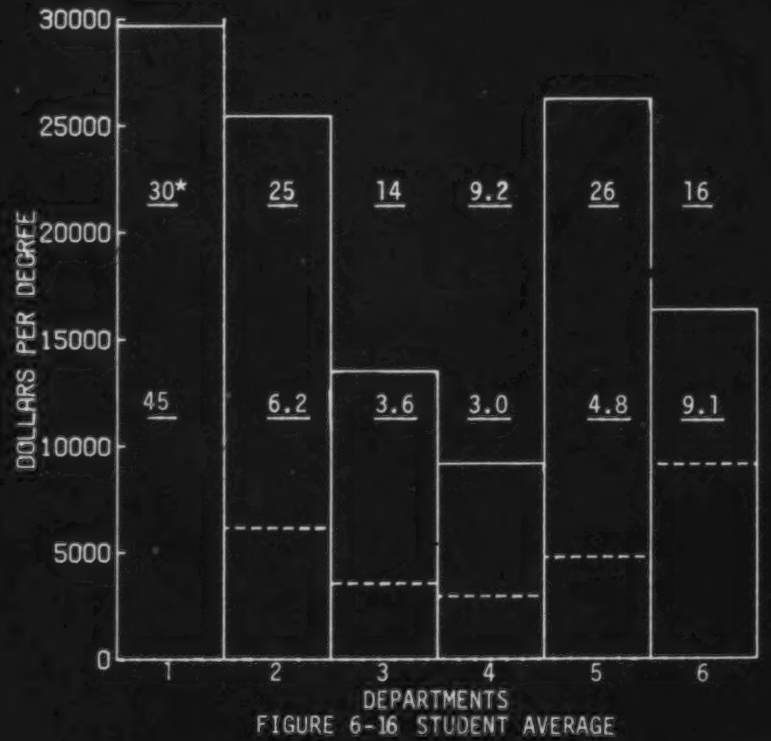


FIGURE 6-16 STUDENT AVERAGE

FIGURES 6-15 AND 6-16: DEPARTMENTAL COSTS BY FIELD PER AWARDED DEGREE

1 = BIOCHEMISTRY 2 = CHEMISTRY 3 = ECONOMICS 4 = ENGLISH 5 = MATHEMATICS

6 = PSYCHOLOGY (—— DOCTORS; ----- MASTERS) (*Thousands of Dollars)

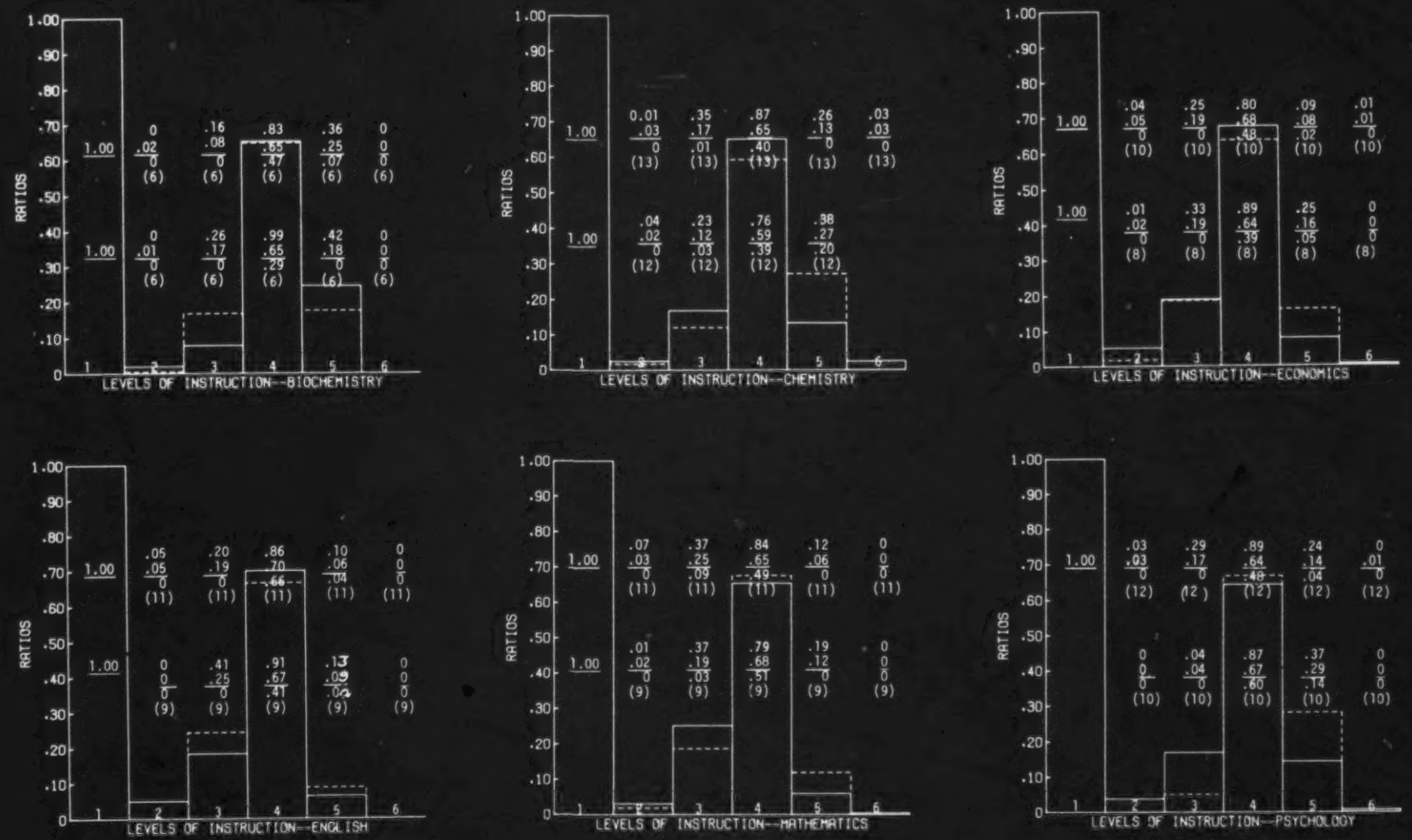


FIGURE 6-17: CROSSOVER ANALYSIS AND TYPICAL PROGRAM STUDENT CREDIT HOURS - MASTERS PROGRAMS

1 = TOTAL 2 = LOWER DIVISION 3 = UPPER DIVISION 4 = GRADUATE CLASSES 5 = INDEPENDENT STUDY AND THESIS
6 = DISSERTATION (—— CROSSOVER ANALYSIS RATIOS; ----- TYPICAL PROGRAM RATIOS)

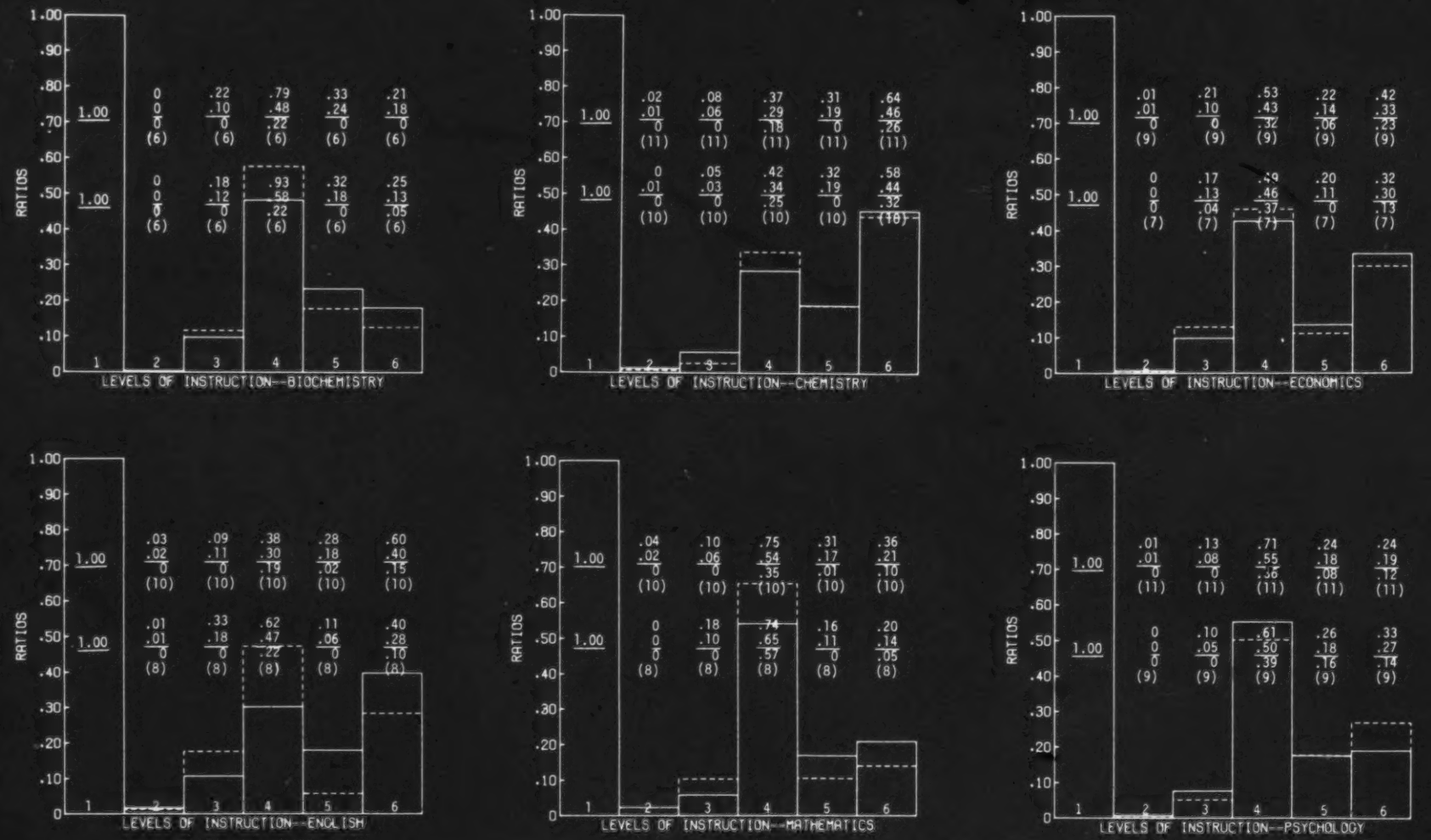


FIGURE 6-18: CROSSOVER ANALYSIS AND TYPICAL PROGRAM RATIOS - DOCTORS PROGRAMS

1 = TOTAL 2 = LOWER DIVISION 3 = UPPER DIVISION 4 = GRADUATE CLASSES

5 = INDEPENDENT STUDY AND THESIS 6 = DISSERTATION

(—— CROSSOVER ANALYSIS RATIOS; ----- TYPICAL PROGRAM RATIOS)

FIGURE 6-19: ESTIMATED DEPARTMENTAL COSTS PER AWARDED DOCTORS DEGREE IN CELL BIOLOGY AT FOUR DIFFERENT INSTITUTIONS
(*Thousands of Dollars)

FIGURE 6-20: ESTIMATED DEPARTMENTAL COSTS FOR SUCCESSIVE YEARS
(*Thousands of Dollars)

collected and sent to us by academic Institutional Representatives associated with a number of participating universities. These typical programs were described in terms of the numbers of SCH, in particular fields and at certain levels, expected to be completed to fulfill the requirements for the Doctor of Philosophy degree. The SCH costs for the specified fields were taken to be those estimated for similar areas, mainly Chemistry and Biochemistry, but including ourzcosts for all six Gradcost fields at the appropriate levels at the particular university studied.

By multiplying the applicable SCH costs by the number of SCH taken at each level, and summing these products, departmental costs ranged from about $12,000 to $32,000 per Doctor of Philosophy degree awarded in Cell Biology as shown in Figure 6-19 for each of the four respondents.

6.13 Departmental Cost Estimates for the Years of 1972-3, 1973-4, and 1974-5

Estimates have been made of annual departmental costs per graduate student enrollee by the COMPCUT procedure for successive years for a number of individual departments insofar as data were available (Figure 6-20).

7. INSTITUTIONAL SUPPORT COSTS

Graduate work in an academic department is "supported" by certain extra-departmental activities and facilities. These costs need to be identified and allocated appropriately to the Bachelors, Masters, and Doctors programs offered in the subject department.

Two types of extra-departmental costs need to be considered: one is associated with general institutional activities which are paid from the unrestricted funds of the institution and usually provide for the libraries, student services, plant operation and maintenance, and general institutional and general administration services used by the academic departments and service units (Table 4-1). The second type is associated with sponsored research and other grant and contract activities and is discussed in Chapter 9.

A number of methods were considered for allocating institutional expenditures to the academic departments, then to the graduate and the Masters and Doctors support programs. To preserve simplicity and because institutional support unit costs are considerably smaller than depart-

mental costs, it was decided to make cost estimates using only that single procedures which promised to give reasonable estimates by the direct and simple pathways.

For each category of expense, "proxies" were established with the help of Advisory Committee members and others, and these have been used in the illustrative calculations set forth in the Supplement.

7.1 Library Costs

To us, it seems appropriate to weight Library costs more heavily against advanced students because of their presumed substantially greater need for and use of library resources. Thus, after consultation with Advisory Committee members and consideration of certain practices now prevailing, use was made of the ratio of the number of graduate students enrolled in the department - each given a weight of four - to the weighted total of registered students enrolled in the institution, where number of freshmen and sophomores were weighted one, juniors and seniors two, and graduate and professional students four. The total allocatable institutional Library cost was multiplied by these ratios to yield an approximation of the Library cost associated with the department's graduate program. Dividing this by the appropriate number of enrolled students gave unit costs (Figure 7) which are similar on the average for the several fields studied.

7.2 Student Service Costs

Student Service costs per student enrolled in the institution, including costs per Masters and Doctors student, were approximated by dividing the total unrestricted student service funds to be allocated by the number of students enrolled in the institution (Figure 7). These also average nearly the same for the fields investigated.

7.3 Plant Operation and Maintenance Costs

In accord with what appears to be common practice, Plant Operation and Maintenance Costs have been allocated to the departments and other units using net assignable area as the proxy.

Of the total institutional space, however, a substantial fraction is often occupied by auxiliary activities such as dormitories, food services, parking lots, etc., which are usually intended to be self-sustaining and are maintained by expenditures not represented in the Plant Operation and Maintenance accounts, or else are maintained at an insignificant net cost per square foot, e.g. parking space. Thus, from

the amount of net usable space available in the institution, these areas - which can be expected to require zero or minimum expenditures from the Plant Operation and Maintenance accounts - have been subtracted, leaving the square feet of space to be used for cost allocation purposes.

The cost of space used for Sponsored Research projects generally is accounted for separately. The fraction of the total Plant Operation and Maintenance expenditures allocated to Sponsored Research was taken to be the ratio of the Sponsored Research space to the total allocatable space multiplied by the allocatable Plant Operation and Maintenance expenditures.

After subtracting the auxiliary activity costs and the Sponsored Research costs from the total Plant Operation and Maintenance expenditures, the amount remaining was allocated to the institution's educational programs.

To estimate Plant Operation and Maintenance institutional support costs for a department, the area of the departmental instructional space was divided by the area of the total institution's instructional space, and the resulting fraction was multiplied by the total costs remaining to be allocated.

To allocate departmental Plant Operation and Maintenance Costs to Masters and Doctors programs, the number of full time equivalent (FTE) students in each departmental program was ascertained, and then the ratios of Masters and Doctors students to the department's total FTE students were computed and multiplied by the department's allocation. The unit costs for Chemistry and Biochemistry, the laboratory sciences studied, are found to be much higher than the cost for other fields although in general the variances are quite great (Figure 7).

7.4 General Institutional Costs and General Administration Costs

The General Institutional expenditures and the General Administration expenditures (Table 4-1) were added to yield "General" costs. From these, the costs of Auxiliary Enterprises plus Hospital were subtracted to yield an approximation of the costs to be allocated.

Allocations to departments were made based upon the ratio of the number of FTE faculty in a subject department to the total FTE faculty of the university. Allocations to Bachelor's, Masters, and Doctors programs from departmental costs were made based on ratios of student credit hours (SCH), weighted one and two for undergraduate and graduate SCH, respectively, on the presumption that more advanced students consumed relatively

FIGURE 7: INSTITUTIONAL SUPPORT COSTS PER STUDENT PER YEAR

1 = BIOCHEMISTRY 2 = CHEMISTRY 3 = ECONOMICS 4 = ENGLISH
5 = MATHEMATICS 6 = PSYCHOLOGY (—— DOCTORS; ----- MASTERS)
(THE 1973-1974 YEAR)

more general institutional resources and more administrative time. The program costs were divided by the numbers of enrollees to secure unit costs (Figure 7).

7.5 Total Institutional Support Costs

The estimated total annual unit institutional support costs are shown in Figure 7 for the Masters and Doctors programs averaged for the departments for each field studied.

For estimation of institutional support costs, representatives of the cooperating institutions had little difficulty in supplying most of the data requested. A few participants had trouble in evaluating the departmental space occupancies which are needed to guide allocation of Plant Operation Maintenance Costs.

These procedures for estimation of institutional support costs embody a number of weighting factors which may or may not be appropriate for use within a particular department or institution. The described procedures preferably should be used only to make comparisons on a relative basis.

8. STUDENT APPOINTMENT COSTS

In graduate and especially in Ph.D. programs, intellectually able, knowledgeable, sensible, hard-working and creative graduate students are needed, and a university may find it desirable to provide financial assistance to help recruit and retain such graduate students.

A highly able graduate student usually will complete his course work and select his dissertation topic earlier, will advance more rapidly through his graduate program, will require less guidance from his professors, will proceed with a lower probability of dropout, will complete a better dissertation sooner, and finally, will make more significant contributions to society during the course of his career.

On this basis, we believe that the costs of recruitment and continuation of graduate students, who are believed by the university to be desirable enrollees in order to provide for Masters and/or Doctors graduates of the desired quality and number, should be considered to be part of the costs of the graduate program.

Consideration may be given to graduate student appointment costs in a number of categories such as fellowships, traineeships, and research

assistantships and teaching fellowships. Of these, the first two do not require service, and thus may be considered as gifts provided on the condition that the awardee continues as a student in good standing and making good progress. The latter two usually require service, and thus are a type of employment. Tuition waivers may be awarded in either category. Figure 8 shows our estimates of the program-average student appointment monies expended per graduate student in several categories for each of the fields studied.

8.1 Fellowships and Traineeships

Fellowships, as well as scholarships and gifts, often go to particularly promising students in order to encourage and assist such students to enter or to continue graduate study. Traineeships are awards sometimes given to attract graduate students into particular fields. Financial aid may also be provided to ethnic minority students - often on a basis of financial need - in order to attract such students into graduate programs. Financial aid to veterans sometimes is also provided. Such awards, whether from either unrestricted or restricted funds, seem to us to be approriate elements to include as costs of graduate programs. These were found to amount to about $1,000 per graduate student in Biochemistry, around $500 in Chemistry and Psychology, and only $100 to $200 in other fields.

8.2 Teaching Assistantships

A Teaching Assistant is a graduate student who is appointed by a university to assist in carrying out the instructional programs of his institution, usually at the undergraduate level, and ordinarily is paid from unrestricted funds. Teaching Assistantship compensation, which is often a major element in a departmental budget (Figure 6-9), was found on the average to amount to about $1,500 per graduate student in Chemistry and Mathematics, around $750 in Economics, English and Psychology, and $200 in Biochemistry (Figure 8).

One might consider that a fraction of the stipend of a Teaching Assistant should be included among the costs of a departmental graduate degree program, because the level of this stipend sometimes is designed in part to attract and retain graduate students of high ability, and/or because the Teaching Assistant's experience in helping with the department's teaching activities is a valuable part of his overall graduate

degree program.

For present purposes, however, we have chosen not to include any part of the Teaching Assistantship stipend as a graduate program cost element in view of the service nature of these appointments. Instead, this cost has been allocated entirely to the undergraduate program.

8.3 Research Assistantships

Research Assistantships are awards given to enrolledzgraduate students in recognition of their service in helping to carry out the research work of the university. The research is usually conducted under the supervision of a professor, and often the activity and findings are used by azgraduate to satisfy some of the requirements for completion of his Masters thesis or Doctors dissertation.

When Research Assistantship monies come from the unrestricted funds of the university, we believe they should be included as costs of departmental graduate programs and also of departmental research programs because the allocation represents a positive choice to make this expenditure for graduate work and research instead of one of the many alternative choices. Such funds were found to amount to about $100 to $200 per graduate student in the fields studied.

Whether to include Research Assistantship expenditures funded by a sponsor's grant or contract monies, wholly or in part, as cost elements in graduate degree programs is a difficult question. While these Research Assistantships often are highly important in relation to both the department's graduate program and its research program, we have chosen not to include these costs as elements in graduate programs, because grant and contract funds are paid through the university to graduate student Research Assistants for research services rendered, and because such funds come to universities dedicated specifically for research rather than instructional activities. Sponsored Research Assistantship monies range from about $500 per graduate student in Chemistry down to almost zero in English.

8.4 Tuition Waivers

At certain institutions, tuition fees, wholly or in part, are waived for some graduate students, and one might consider that the value of such waivers should be included as an element of the cost of a graduate degree program.

However, most of the costs discussed above have been clearly identifiable as specific expenditures of institutional funds. Tuition waivers are different. They do not involve any transfer of money, but, on the other hand, they do involve transfers that may be equivalent to exchange of money.

This ambivalence gives rise in some institutions to simply ignoring tuition waivers in their accounting system, but maintaining control over the distribution of waivers through entirely different procedures than those used to control flow of money. Other institutions include tuition waivers in their financial accounting systems and treat them in just about the same way as any other money is treated.

For purposes of this study, the authors finally decided not to include tuition waivers as a cost of graduate education partly for the above-stated reasons, but mostly because the tuition waiver data provided from the participating departments and institutions were not sufficiently complete to permit confidence to be placed in any figures which might be calculated.

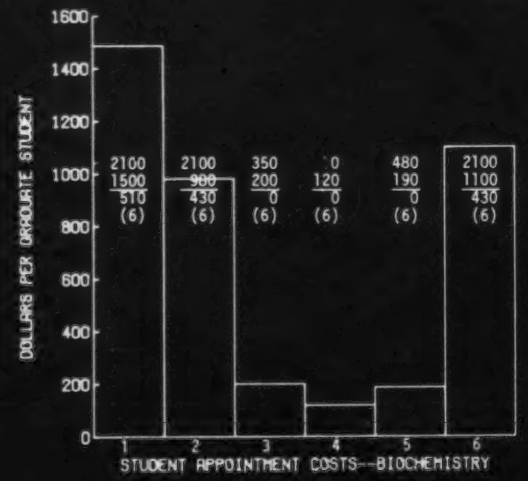
8.5 Total Graduate Student Appointment Costs

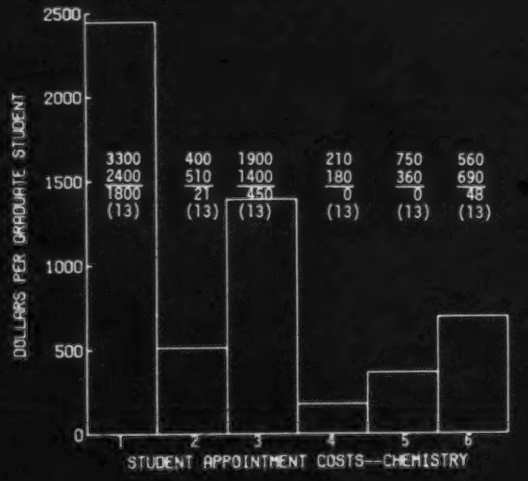
The above-described expenditures for graduate student appointments, including both service and non-service types, are important elements in graduate programs, because they are of major assistance to a university in the recruitment and retention of graduate students of high ability and promise.

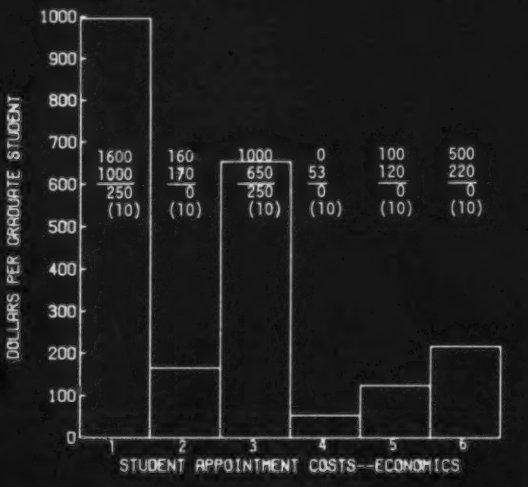
Thus, as a reflection of the inducements offered to prospective and actual graduate students, the average total expenditures per graduate student for each scholarly field have been estimated and are shown in Figure 8. These are highest in Chemistry ($2,400) and Mathematics ($1,900), less in Biochemistry and Psychology ($1,500), and lowest in Economics and English ($1,000). The higher levels prevail in fields where grant and contract research funds tend to be available.

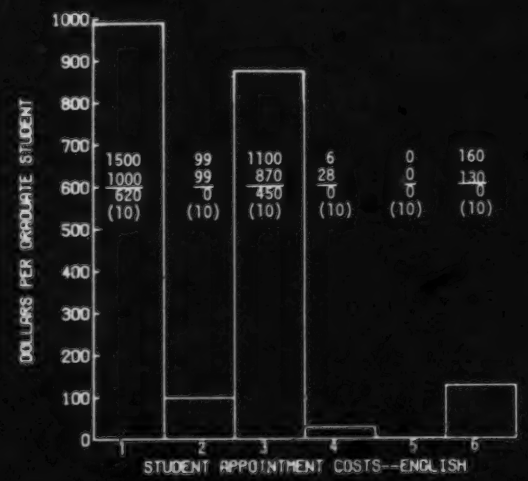
8.6 Allocation of Student Appointment Costs to Graduate Program

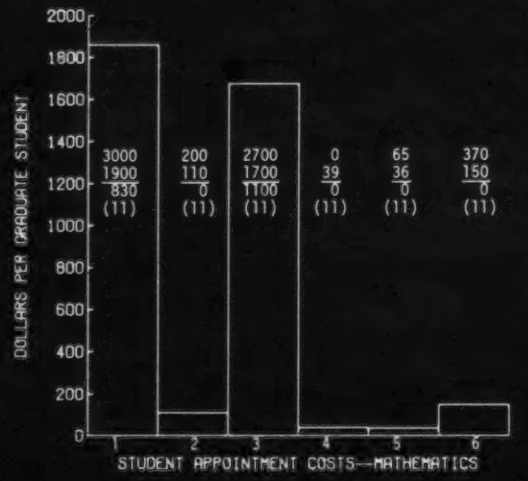
Only the expenditures for Fellowships, Traineeships and unrestricted Research Assistantships are considered to be costs of graduate programs, although there were differences of opinion among our own Advisory Committee members concerning whether even these monies should be counted as costs of graduate education. Expenditures on the average











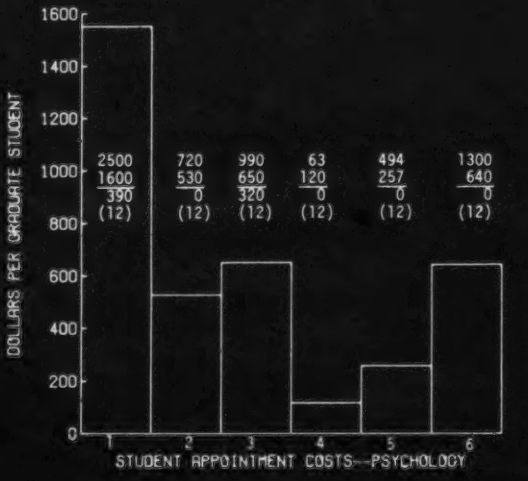


FIGURE 8: STUDENT APPOINTMENT COSTS

1 = TOTAL 2 = FELLOWSHIPS AND TRAINEESHIPS 3 = TEACHING ASSISTANTSHIPS
4 = RESEARCH ASSISTANTSHIPS (UNRESTRICTED $) 5 = RESEARCH ASSISTANTSHIPS
(RESTRICTED $) 6 = TOTAL ALLOCATED TO GRADUATE PROGRAM
(THE 1973-1974 YEAR)

amounted to $1,100 per graduate student in Biochemistry, $600-$700 in Chemistry and Psychology, and only $100-$200 in Economics, English and Mathematics.

9. UNIVERSITY RESEARCH

Research is a major activity at most universities which offer doctoral programs, and thus the nature of university research and its relationship with graduate programs and their costs will be considered in the following paragraphs.

9.1 The Role of Research in the Universities

In colleges and universities today, teachers and professors are expected to devote a certain fraction of their time to scholarly activity and research in their field because, in an immediate sense, this activity contributes to maintenance of quality and freshness in their presentation of courses of formal instruction to all students.

Generally, higher quality and more extensive scholarly activity and research by professors is required as the level of teaching becomes more advanced. Thus, these activities may be of little importance in Community Colleges, and only moderate importance in Bachelors institutions, but become of major significance at universities offering programs leading to Masters and especially Doctor of Philosophy degrees.

In addition, as an element in all graduate programs, and as the central element in programs leading to the degree of Doctor of Philosophy, professors are expected to give guidance to help graduate students learn how to find and/or apply the new knowledge.

The basic requirement which must be satisfied to make appropriate the award of the Ph.D. degree is the writing and successful defense of a dissertation which sets forth new knowledge and thus serves to demonstrate that the new Ph.D. awardee can contribute, and, in fact, has contributednew knowledge, and that the awardee presumably has gained the capability of continuing to contribute new knowledge throughout his or her life.

Professors serve as models to teach and demonstrate how to discover new knowledge. Thus, professors themselves must regularly carry out scholarly work and research, and from time to time report the findings in the major journals for their field. Doctoral students, who at first often function as research apprentices to their professors, mature to play the role of research interns or junior co-workers in the latter stages of

their graduate work.

This scholarly and research activity by professors and graduate students, in addition to its contribution to teaching and learning, gives rise to another major benefit - the new knowledge which is produced and made available to all interested persons by its publication in the scholarly literature.

Thus, research plays an important role at universities and yields significant benefits to society and the Nation.

9.2 The Joint Cost-Benefit Problem and Our Approach

Substantial expenditures are made by many universities to pay for research activities. Since at least two main benefits, the instruction of students and the creation of new knowledge, arise out of these activities, one might consider dividing the costs among these jointly produced benefits.

One may ask whether a university should be viewed as carrying on research programs to produce new knowledge as a part of, or separate from, its instructional program to teach students.

Our view is that a university (at least one which offers Ph.D. programs) should be considered as carrying out both instruction and research programs, which generally are not separable and overlap extensively.

This concept will now be developed by estimating the unrestricted fund expenditures made within a department for scholarly activities and departmental research, and then the sponsored research expenditures made from restricted funds arising from grants and contracts. The sum of these two elements will reflect on a conservative basis the total research effort of the department. Finally, the relationship of these research expenditures to the costs of graduate programs of the department will be considered.

9.3 Departmental Research and Its Costs

The name "departmental research" is given to faculty research and scholarly activities which are not immediately related to a particular course or level of formal instruction, but are devoted to the maintenance and enhancement of high quality performance in a professor's instructional and research duties. Costs of these activities generally are paid by use of unrestricted funds reflected in the departmental budget.

Approximate and conservative, and rather arbitrary, estimates of the total unrestricted fund expenditures made in favor of the research programs of the participating departments were made by summing two elements which have already been considered to be costs of Instruction as well. The first consists of the total of the costs of faculty time reported in the FAA (Figure 6-3) to be devoted to student instruction in the ISTH and DISS categories.

The second is a part of the cost of faculty time devoted to Scholarly Activity. This was obtained by distributing the total departmental expenditure for Scholarly Activity by the faculty among the several levels of instruction using the same weighting factors as those described above in Section 6.6 (i.e., 1, 3, 5, 7, and 10 for LD, UD, GC and IS, TH, and DISS respectively), and then summing the values found for the GC, IS, TH and DISS levels.

Taken together, these two elements seem to the authors to reflect the main departmental expenditures for faculty time devoted rather specifically to Research and, at the same time, to Instruction.

To maintain simplicity, institutional support costs for libraries, plant operation and maintenance, general costs, etc., have not been included in our estimates of relative expenditures for departmental research, and in any case, these were allocated to instructional programs as described above.

Total estimated departmental research program expenditures were divided by the number of faculty members to obtain unit values, and departmental averages and quartiles were then calculated. It was found (Figure 9-1) that the annual expenditures per faculty member amounted to about $20,000 for Biochemistry, Chemistry and Economics, and then to about $17,000, $16,000 and $13,000 for Psychology, Mathematics, and English, respectively. Expenditures per graduate student (Figure 9-2) follow a similar trend with around $8,000 going for Biochemistry, Chemistry and Mathematics, and then about $6,400, $4,600 and $3,500 going for Psychology, Economics and English, respectively.

These estimates reflect only the university's outlay for faculty salaries. The full magnitude of the replication costs of departmental research programs is much higher because extensive research activity is conducted, often without compensation, by Masters and Doctors students

to fulfill the requirements for graduate degrees.

Our view is that these unrestricted fund expenditures are made in favor of both the Research Program and the Instruction Program of a department.

9.4 Sponsored Research and Its Procedures

During the last few decades, "sponsored" research has come into major importance at certain universities. This arrangement was evolved during World War II and provides for the carrying out at universities of research activities of special interest to the Federal government or other sponsors. Research of a basic and advanced nature is often sponsored at universities so that advantage can be taken of the special capabilities of professorial experts with their graduate students and sometimes unique laboratory facilities.

Sponsored research means research conducted under the terms of a grant or contract between the sponsor and a university whereby the university agrees to carry out research activity directed toward a stated objective and usually according to a specified plan, and the sponsor agrees to provide the funds to pay in full or in part for the agreed-upon research activity.

To initiate a sponsored research project, a "Proposal" is written by a professor who later usually becomes the "Principal Investigator." This paper is ordinarily prepared in response to a publicized invitation from a potential sponsor, and sets forth the objectives, plans, procedures and results expected from this research. The Proposal usually includes a schedule for carrying out phases of the program and also a budget giving in appropriate categories the funds needed to pay the direct costs of the activity such as salaries, wages, supplies, equipment, etc.

In addition, the Proposal usually requests funds to pay for most of the indirect costs incurred by the university on an extra-departmental level in carrying out the sponsored research activity. Ordinarily these costs are identified based upon policy statements of the Federal government (Circular A-21) and applied to a particular university as agreed upon as a result of negotiations between fiscal officers of the university and of the Federal government or sponsor.

The Proposal, often after informal preliminary discussions with

representatives of the prospective sponsor, is reviewed and approved by appropriate officers of the university such as the departmental chairman, the college dean, and the Dean of the Graduate School, and then transmitted formally to the sponsor for his review. In most cases, there is substantial competition for the funds available to sponsor research in a particular field or relative to a specific problem. Thus, the contents and merits of each of the several proposals received are carefully compared by the sponsor, and the grant or contract which is finally awarded is made in favor of the Proposal deemed to be the best among those received.

After representatives of the sponsor and the university have given final approval to the Proposal, the Professor-Principal Investigator, and usually together with graduate student Research Assistants and/or post-doctoral appointees, proceeds to carry out the research activity as agreed upon.

Funds are expended by the Principal Investigator in accord with the approved Proposal budget and with monitoring by the university. Research progress reports may be made periodically to the sponsor. Of special importance with respect to research sponsored at a university is the usual policy requiring that the results be made available promptly to all interested persons by publication in the scholarly literature of the subject field.

9.5 Sponsored Research in the Departments Studies

Information concerning annual direct expenditures for sponsored research conducted in the departments studied was collected by use of the questionnaires included in the Supplement. This was reduced to a unit basis, and departmental averages were calculated.

Among the fields studied, sponsored research expenditures per faculty member for the 1973-74 year (Figure 9-1) amounted to around $40,000 for Chemistry and Biochemistry, about $8,000 for Economics and Psychology, $3,000 for Mathematics, and $1,000 for English. Per graduate student (Figure 9-2) expenditures for Biochemistry averaged about $30,000; Chemistry and Psychology, around $4,000; Economics and Mathematics, $1,000; and English, nearly zero. Within a particular field, major differences are evident among the responding departments.

As part of the present study, representatives of some participating

departments completed questionnaires concerning sponsored research (see Supplement). However, the responses received were so few in number and so varied in point of view that only a few qualitative comments seem appropriate to record: almost all sponsored research expenditures are viewed as contributing substantially to the departmental research and instructional programs; sponsored research activity is of major importance with respect to departmental doctoral programs, and most respondents stated that any substantial decrease in sponsored research awards would result in a significant decrease in the quality of their doctoral program; sponsored research activity is viewed as of minor and almost no importance for Masters and Bachelors programs, respectively. Sponsored research funds provide important assistance to departmental research programs, and especially in the form of Research Assistantship stipends, faculty compensation for research activity during summers, and to a lesser extent, faculty compensation for part time research activity during the academic year, post-doctoral appointee stipends, supplies, equipment, travel, etc. The relativezimportance of these categories differ substantially among the fields studied, and in the laboratory sciences, the Research Assistantship awards are particularly important.

9.6 Allocation of the Costs of Sponsored Research

Our view is that when sponsored research activities with a department are conducted jointly by professors and graduate students who serve as apprentices or junior associates, with entirely open, full and frequent discussions of the research activities, then all ofzthe costs or expenditures associated with such research activity should be recognized as part of the departmental Research Program, and as closely related to its Doctors Program.

However, if thezsponsored research activities are conducted by staff personnel substantially separated in place and/or time from the Masters or Doctors students and their departmental professors, then clearly such activities should be considered only as part of the departmental Research program but not significantly related to departmental graduate degree programs.

Generally, it seems essential to inquire into particular arrangements for sponsored research which prevail for each field, for each department, and indeed for each project in order to be able to

estimate rationally what fraction of the sponsored research activity might be considered to be important to a departmental Ph.D. program. We understand that, except in the case of a national emergency or an urgent public need, most universities as a matter of policy accept sponsorship for research only when the sponsored activities are of interest to faculty members and significantly enhance the education program of the institution.

Sponsored research is often regarded as a desirable activity within a department in view of the fact that research of interest to professors and students is encouraged and assisted by funds which the sponsor elects to provide because the proposed research activities and promise of results are of significant importance to him. In most research grant arrangements between the university and the sponsor, what the sponsor bargains for and pays for, and what the university agrees to provide, is an output of significant new knowledge, or an earnest approach thereto. Therefore, the university, by conducting the agreed-upon research activities, completes fully what it promised to perform in accepting the sponsor's grant or contract, although substantial benefits may simultaneously accrue to the instructional programs.

Accounting procedures, which suggest that sponsored research costs be apportioned in some arbitrary way between the graduate and the research programs of a department, are inappropriate, in our opinion, because such procedures would not reflect the total costs of providing or replicating either the quality of the departmental Research Program or the research experience received by students in the departmental Instruction Programs.

While the authors recognize the major significance and contribution of sponsored research funds in relation to the quality of Ph.D. programs in many fields, we have not included any part of sponsored research expenditures as elements of the costs of graduate degree programs because the sponsor and the university have agreed that the central feature of the bargain is to be research activity, and also because a better understanding is needed of the relationships which prevail between sponsored research activity and the graduate programs offered by the faculty of departments.

9.7 Total Unit Research Program Expenditures of Departments Studied

Total annual Research Program expenditures per faculty member in

the departments studied were estimated by summing departmental research and sponsored research expenditures. Per faculty member (Figure 9-1), these expenditures in thousands of dollars were: Biochemistry, 35, 61, 93; Chemistry, 24, 65, 51; Economics, 12, 28, 30; English, 8.7, 14, 19; Mathematics, 9.5, 20, 29; and Psychology, 16, 25, 33; where the average is underlined, and the preceding and following numbers are the lower and upper quartiles, respectively. Sponsored research expenditures amounted to around three-fourths of the total Research Program expenditures in Biochemistry and Chemistry, but only around one-fourth in Economics, Mathematics, and Psychology, and almost zero in English.

Per graduate student (Figure 9-2), total annual Research Program expenditures in thousands of dollars were: Biochemistry, 23, 40, 50; Chemistry, 9, 12, 14; Economics, 3.3, 5.8, 7.1; English 1.9, 3.6, 4.3; Mathematics, 7.1, 10, 11; and Psychology, 5.4, 9.7, 9.1. Except for Biochemistry, the departmental research expenditures made up a major fraction of the total departmental Research Program expenditures. 9.8

9.8 Research Universities and Their Importance to the Nation

Long continued tradition of high quality scholarship and productivity in research has brought into being a relatively small number of university centers of excellence. These may appropriately be called "research universities" in view of their outstandingly talented professors, graduate students, staffs and special facilities. Such universities tend to give strong unrestricted money support to their graduate and research programs, and also to win important sponsored research funding. Outstandingly promising students are attracted into their graduate programs where they usually receive excellent Ph.D. training, and often go on to fill important places in the educational and research institutions of the Nation.

The research universities award the major proportion of the Ph.D.'s granted in the United States. Since they are distributed widely throughout the United States, they serve as important regional as well as national centers for scholarship and research.

At research universities, student fees, State Legislative appropriation, endowment income and private donors generally provide support for the Instructional Programs leading to Bachelors, Masters and Doctors degrees, while the federal government and other sponsors add highly important support for the Research Programs.

Our study of the sponsorship of university research by agencies of the Federal government has led us to the conclusion that these arrangements are of great value and benefit to the Nation for the following reasons: (a) significant research results are usually produced; (b) graduate students are trained to conduct research; (c) the overall cost of these research and training activities probably is substantially less than the cost of conducting these activities outside the universities; (d) "basic" or fundamental research, which is needed by society in general to help provide the foundation for applied research directed toward the solution of the problems of society, is the type of research ordinarily conducted at universities, and basic research probably can be carried out more effectively by professor-student teams, than in more mission-oriented laboratories outside universities; (e) the quality of sponsor research tends to be maintained at a rather high level as a result of use of the peer review system and the competitive procedures used to select for sponsorship the best proposals out of a larger number submitted for consideration; (f) publication of sponsored research findings ordinarily occurs promptly in the form of Masters theses and Doctoral dissertations and in the scientific literature, so the results are made available to all interested persons; (g) research activity in particular areas may be encouraged by allocation of Federal sponsorship funds as may be needed in view of national interests, and at the same time graduate students are trained for research in the subject areas; (h) Federal sponsorship of research, as a result of the procedure of making awards on a competitive basis, tends to provide for the identification of the most productive and promising basic researchers and research teams in the Nation, and also tends to keep such university research groups functioning and in readiness to help cope with societal and national problems when they arise.

To provide for research activities at Ph.D.-granting universities, and especially at the research universities of the Nation, substantial funds will continue to be needed from the unrestricted monies of the universities, and also from extra-university sponsors, and especially from the Federal government. Two basically important purposes will be served: maintenance of high quality in Ph.D. training programs, and generation of new knowledge and new applications of knowledge - both essential for the continuation and further development of the excellence and the world leadership which the research universities of the United States have achieved today.

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FIGURE 9-1: RESEARCH PROGRAM EXPENDITURES PER FACULTY MEMBER PER YEAR
1 = TOTAL 2 = DEPARTMENTAL 3 = SPONSORED RESEARCH
(THE 1973-1974 YEAR)

FIGURE 9-2: RESEARCH EXPENDITURES PER GRADUATE STUDENT
1 = TOTAL 2 = DEPARTMENTAL 3 = SPONSORED RESEARCH
(THE 1973-1974 YEAR)

10. TOTAL ESTIMATED COSTS: PRESENTATION, ANALYSIS AND COMMENTARY

Total annual graduate degree program cost estimates were obtained by summing the averages of the departmental costs, institutional support costs, and student appointment costs. Unit costs have been calculated by dividing the total annual graduate degree program cost in one case by the number of awarded graduate degrees. Average costs are first compared, and then costs for individual departments are considered.

10.1 Average Program Total Annual Costs Per Graduate Student

Estimated annual costs per enrolled Masters and Doctors students are summarized in Figure 10.1. For most programs studied, departmental costs amount to 60-80 percent of the total cost whereas the instructional support costs and the student appointment costs, only about 20-25 and 0-5 percent, respectively.

Costs per Doctors student are estimated to be some 40-50 percent higher than per Masters students in the fields of Chemistry, Mathematics and Psychology, and ten to twenty percent higher in Economics and English. For Biochemistry, relative Doctors to Masters costs are probably similar to those shown for Chemistry, and the high Masters costs shown in Figure 10-1 seemingly is caused by inaccurate counting of graduate students as enrolled in Masters versus Doctors programs.

To provide a better basis for comparison of the disciplines by avoiding the errors which often arise as a result of difficulties in counting students enrolled in Masters versus Doctors programs, costs have been calculated per enrolled graduate student, and these are given in Figure 10-2 and in the following tabulation:

TABLE 10-1

ESTIMATED TOTAL ANNUAL COSTS PER ENROLLED GRADUATE STUDENT
(in 1973-74 U.S. dollars/12 month year)

Field	Number of Departments	Estimated Cost[a]		
Biochemistry	6	4,400,	18,000,	25,000
Chemistry	11	5,200,	8,100,	11,000
Economics	8	2,700,	4,100,	5,500
English	10	1,800,	3,000,	3,700
Mathematics	9	3,800,	6,200,	8,000
Psychology	9	3,400,	5,600,	7,100

[a] The underlined number represents the mean of the values available. To suggest the wide range of the estimated costs, lower and upper quartile values are shown preceding and following the mean, respectively.

The average annual unit costs differ substantially for the several fields studied although the Biochemistry figure may not be representative because of the small number of departments studied.

Total costs were not calculated for successive years because of limitations in available data, but for a small number of individual departments, we were able to estimate departmental costs for two or three of the years of 1972-73, 1973-4 and 1974-5 (Figure 6-20). In all cases except one, costs increased insignificantly and about as might be expected in view of inflation. For Psychology Department B, the lower unit cost for 1973-74 relative to 1972-3 was caused mainly by a substantial decrease in graduate student enrollment without much change in the departmental budget.

10.2 Individual Program Total Annual Costs Per Graduate Student

The above-considered costs are averages of individual graduate program costs which differed widely. To try to understand these differences, and in spite of the small numbers of data sets available, correlations of costs with other characteristics of individual departments and institutions were attempted.

Of the three main elements, i.e., departmental costs, institutional support costs, and student appointment costs, study was devoted only to departmental costs since there are relatively the largest (Figure 10-1) and also should be most closely related to departmental and institutional characteristics.

10.2.1 Definition of Factors or Variables

Certain factors or variables, believed to be of possible influence on departmental costs, were arbitrarily identified, and these, represented by acronyms, are defined as follows: DCOST - the annual departmental cost per graduate student; FACT - the annual cost of departmental faculty time devoted to graduate programs and scholarly activity, as indicated by the FAA, per graduate student; NPHD - the number of Ph.D. degrees awarded each year per 1000 enrolled graduate students enrolled in the subject department; SIZE - the number of graduate students enrolled in the subject department, SPONR - the funds awarded annually for sponsored research in a department per faculty member; GSCH - the number of graduate credit hours per 1000 total for the department; ROOSA - the decile ranking of a department out of total number of departments reported upon by Roos and Anderson[14] in the subject field; TYPE - public or pri-

(14) A Rating of Graduate Programs, K. D. Roos and C. J. Andersen, American Council on Education, Washington D. C. (1970).

vate institutions. All doctoral-granting departments were studied for which sufficiently complete information was available.

10.2.2. Mean Values of the Factors

Mean values of the factors are shown in Table 10-2 where certain relationships may be perceived. In several cases, DCOST and FACT are numerically similar. The average number of doctoral awards per thousand enrolled graduate students, NPHD, is lowest in Economics, English and Mathematics (about 10C), and higher in Psychology (138), Biochemistry (166) and Chemistry (190). The average number of enrolled graduate students, SIZE, ranges from a low of 30 to a high of 151 in English, with some 60-80 enrollees in other fields. Sponsored research funds per faculty member, SPONR, are high in Biochemistry ($46,000) and Chemistry ($20,000), modest in Psychology ($4,200), and less than $2,000 in the other fields.

Graduate student credit hours, GSCH, average around 90 per 1000 total departmental hours in all fields except in Mathematics where the low value of 49 probably reflects heavy undergraduate service courses, and in Biochemistry where the high value of 602 shows that most teaching in this field is done at the graduate level. On the average, the departments studied were ranked in the middle deciles by the Roos-Anderson, ROOSA, peer appraisal system. Using the digits 1 and 2 to represent public and private institutions, respectively, the 1.5 average value of this variable indicates that approximately equal numbers of each TYPE of institution were included in this part of the study.

10.2.3 Scaling Most Factors as Logarithms

Since skewness departures from normal or Gaussian distributions of individual points were indicated in many cases, upper and lower quartiles rather than standard deviations have been made in this report to represent the scattering of the points. For the same reason, standard deviations in most cases are not given relative to the averages shown in Table 10-2.

However, for optimum development of correlations and interrelations among the data points, approximately normal distributions are needed. Thus all individual data points, except those for the ROOSA and TYPE variables, were scaled as base ten logarithms, and this transformation was found to yield an acceptable approximation to a normal distribution. The means and standard deviations for the logarithmic-scaled and other variables are given in Table 10-2.

TABLE 10-2

AVERAGE VALUES AND OTHER DATA CONCERNING THE FACTORS[a] STUDIED

Field	Number of Cases	DCOST	FACT	NPHD	SIZE	SPONR	GSCH	ROOSA	TYPE
Biochemistry	6	5600[b]	5600	166	30	46,000	602	5.2	1.5
		3.76[c]	3.75	2.22	1.47	4.66	2.78	-	-
		0.317[d]	0.349	0.176	0.410	0.204	0.250	(2.8)[e]	(0.55)[e]
Chemistry	11	5700	3700	190	67	20,000	91	5.8	1.5
		3.76	3.56	2.28	1.83	4.31	1.96	-	-
		0.177	0.135	0.102	0.382	0.240	0.185	(2.9)	(0.52)
Economics	8	2900	3000	107	66	600	93	7.7	1.4
		3.46	3.48	2.03	1.82	2.78	1.97	-	-
		0.174	0.144	0.105	0.310	1.78	0.231	(2.8)	(0.52)
English	10	1600	1100	99	151	100	93	5.5	1.5
		3.21	3.03	1.99	2.18	2.00	1.99	-	-
		0.225	0.767	0.195	0.412	1.53	0.249	(3.0)	(0.53)
Mathematics	9	4400	5100	95	80	1700	49	6.4	1.4
		3.64	3.71	1.98	1.90	3.22	1.69	-	-
		0.248	0.309	0.211	0.497	1.23	0.214	(3.5)	(0.53)
Psychology	9	3400	3200	138	79	4200	89	4.5	1.4
		3.53	3.50	2.14	1.90	3.62	1.95	-	-
		0.176	0.085	0.121	0.276	1.38	0.219	(3.1)	(0.53)

[a] Definitions and dimensions for the factors are given in Section 10.2.1; [b] Average value of the factor; [c] Base ten logarithm of the average; [d] Standard deviation of the logarithm of the factors; [e] Standard deviation of the factor.

TABLE 10-3

CORRELATION COEFFICIENTS RELATING DEPARTMENTAL COSTS (DCOST) WITH THE FACTORS[a] STUDIED

Field	Number of Cases	FACT	NPHD	SIZE	SPONR	GSCH	ROOSA	TYPE
Biochemistry	6	0.76	-0.37	0.01	0.34	0.76	-0.21	-0.18
Chemistry	11	0.58	0.85	-0.23	-0.47	0.46	0.31	-0.16
Economics	8	0.50	0.65	-0.42	-0.00	0.65	0.46	-0.02
English	10	0.31	0.71	-0.44	0.13	-0.08	0.43	-0.02
Mathematics	9	0.97	0.39	-0.42	-0.21	0.30	0.53	-0.20
Psychology	9	0.65	0.54	-0.28	0.17	0.08	0.15	-0.47

[a] Definitions and dimensions for the factcrs are given in Section 10.2.1

TABLE 10-4

CONSTANTS, COEFFICIENTS AND OTHER DATA RELATING TO THE MODEL EQUATION

Field	Number of Cases	"a" (Constant)	"b" (FACT) [a]	"c" (NPHD)	"d" (SIZE)	"e" (SPONR)	R Squared (non-forced)
Biochemistry	6	-5.84	1.46 [b]	1.30	0.770	0.018	-
		2.2	0.47	0.87	0.64	0.85	-
		-	0.58 [c]	0.58	0.97	0.97	0.95 [d]
Chemistry	11	-1.42	0.848	1.04	0.300	-0.176	-
		1.72	0.49	0.41	0.15	0.13	-
		-	0.34	0.72	0.80	0.85	0.86
Economics	8	2.60	0.487	0.689	-0.496	0.070	-
		2.78	0.55	0.62	0.46	0.069	-
		-	0.25	0.52	0.54	0.69	0.69
English	10	1.24	0.087	0.885	-0.123	0.098	-
		0.77	0.061	0.29	0.14	0.033	-
		-	0.31	0.72	0.72	0.91	0.86
Mathematics	9	0.795	0.565	0.532	-0.059	-0.059	-
		0.30	0.13	0.30	0.057	0.052	-
		-	0.95	0.96	0.97	0.98	0.98
Psychology	9	-0.318	0.953	0.338	-0.119	0.0043	-
		3.1	1.0	0.66	0.23	0.057	-
		-	0.42	0.45	0.47	0.48	0.92

[a] Definitions and dimensions for FACT, NPHD, SIZE and SPONR are given in Section 10.2.1. [b] The first and second row, for each field, show the numerical values of the constant or coefficient, and their standard deviations, respectively. [c] The third row for each field shows the R Squared values resulting from stepwise introduction of the factors in the sequence: FACT, NPHD, SIZE and SPONR. [d] For first four variables resulting from non-forced regression analyses using all seven variables.

10.2.4 Correlation Coefficients

Correlation coefficients[15] were calculated with the aid of certain computer programs described in the Statistical Package for Social Sciences[16]. The coefficients relating DCOST to other variables are shown in Table 10-3, and those interrelating all variables are given in the Supplement.

DCOST correlates to some degree with most of the variables studied, but the strength of the relationship varies with the field, a result probably to be expected in view of the differing traditions and practices of the several disciplines.

Moderately strong relationships are found in most cases between DCOST and the cost of faculty time per graduate student, FACT, and also the NPHD, SIZE, and SPONR variables. More scattered and often weaker relationships are found with GSCH, TYPE and ROOSA.

The negative coefficient of SIZE indicates, as expected, that graduate costs tend to decrease with increase in numbers of enrolled students. The sign of the SPONR coefficient for chemistry is also negative, suggesting that departmental costs become lower as sponsored research activity increases. Biochemistry gives the opposite indication, but this probably is not meaningful in view of the large scattering of the data points.

10.2.5 Linear Regression Equation Models

To develop quantitative relationships among the variables, linear regression analyses were carried out. Because of the small number of departments studied, it was desirable to work with the minimum practicable number of variables and, in view of their relatively strong correlation with DCOST in a number of cases, four were chosen: FACT, NPHD, SIZE and SPONR. Those not selected show less strong and/or less consistent relationships with GCOST and, on the other hand, they often correlated significantly with one or more of the chosen factors, e.g., ROOSA and TYPE with SIZE (0.65 to 0.96). GSCH with NPHD (0.39 to 0.95), etc.

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[15] Between two variables studied, a coefficient of one or minus one indicates perfect correlation, a coefficient of zero indicates no relationship. Intermediate values indicate stronger correlations as the fractions approach unity. A negative sign indicates a decrease in one variable with increase in the other.

[16] SPSS (Second Edition), N. H. Nie, C. H. Hull, J. G. Jenkins, K. Steinbrenner, and D. H. Bent, McGraw-Hill Book Co., New York (1975).

Final linear regression analyses were carried out with the DCOST, FACT, NPHD, SIZE and SPONR variables in logarithm form, and these calculations were "forced" by introducing the variables FACT, NPHD, SIZE and SPONR into the regression calculations in the order named. Results were obtained for each field using a regression equation of the form:

$$\log(\text{DCOST}) = a + b \log(\text{FACT}) + c \log(\text{NPHD}) + d \log(\text{SIZE}) + e \log(\text{SPONR})$$

and numerical values of the constants and coefficients are shown in Table 10-4. For each constant and coefficient, values were calculated for the "F" ratio and for a 95% confidence interval, and the results obtained (see Supplement) emphasize the preliminary nature of these analyses.

To suggest the extent to which a particular variable sequentially "explains" the variance of DCOST, values of a parameter called "R Squared" are included in Table 10-4. R Squared is a fraction which may range in value from zero to one, and larger values indicate an increasing level of explanation for the variations of DCOST.

With Chemistry, for example, FACT explains 0.34 or 34% of the variation of DCOST. Adding the variable NPHD provides for a 0.72 explanation, and adding the influences of SIZE and SPONR finally yields a 0.85 explanation of the variance of the data.

On this basis, the four variables used in the model account for most of the variance in departmental costs for Mathematics (0.98), Biochemistry (0.97), English (0.91) and Chemistry (0.85). The model equations function much less well for Economics (0.69) and Psychology (0.48).

Regression analyses were also carried out using all seven variables without forcing the sequence in which the variable was added, and the R Squared values prevailing after the first four variables were introduced are given in Table 10-4. These values are generally similar to those obtained using the forced sequence although in a few cases the variables were somewhat different. For psychology, the increase of R Squared from 0.48 to 0.92 was mainly the result of introduction of the ROOSA variable.

The standard deviations given in Table 10-4 are generally large relative to the means reported, and thereby demonstrate the weakness of the model. However, the equations moderately well predict annual departmental costs for individual departments as is exemplified by the following values of predicted dollar costs for the eleven chemistry departments studied

in comparison with our estimated costs which are given in parentheses: 3,200 (3,200), 4,400 (4,000), 4,700 (4,300), 5,000 (4,300), 5,000 (5,600), 5,300 (4,300), 5,800 (6,100), 6,900 (6,400), 7,800 (8,000), 10,500 (10,400) and 10,900 (10,800) dollars per graduate student per year.

Following the helpful suggestion of our colleague, Economics Professor Masanori Hashimoto, regression analysis was also carried out on a "non-forced" basis using data pooled from all the departments studied. Variables considered were the above-define logarithmetricly scaled DCOST, FACT, NPHD, SIZE, SPONR and GSCH; the non-logarithmetricly scaled ROOSA and TYPE; and five "dummy" variables, BIOC, ECON, ENGL, MATH AND PSYC, representing Biochemistry, Economics, English, Math and Psychology, respectively. The resultant linear regression equation is:

$$\begin{aligned}\log(\text{DCOST}) = {} & 3.52 + 0.16 \log(\text{FACT}) + 0.20 \log(\text{NPHD}) + \\ & - .32 \log(\text{SIZE}) + 0.01 \log(\text{SPONR}) - .03 \log(\text{GSCH}) \\ & + 0.08\ (\text{TYPE}) - 0.05\ (\text{ROOSA}) - 0.14\ (\text{BLOC}) \\ & - 0.14\ (\text{ECON}) - 0.30\ (\text{ENGL}) - .03\ (\text{MATH}) \\ & - .22\ (\text{PSYCH}).\end{aligned}$$

Departmental costs for Chemistry are calculated when the variables for all other fields are assigned the value of zero. To calculate Economics or some other specific field, the single variable representing this field is assigned the value of one, while those for other fields are taken to be zero. Using fifty-three sets of data, this regression yielded an R Squared value of 0.75 with an overall F of 10.0, significant at less than 0.001.

10.2.6 Conclusions Concerning the Influence of Departmental Characteristics

Generally, it may be appropriate only to deduce qualitatively that the observed wide variations in annual departmental costs per graduate student, DCOST, apparently are the result mainly of policy-based or pragmatically-based decisions which give rise to wide differences in the amount of faculty time devoted to graduate education and scholarly activity per graduate student, as reflected by the variable, FACT.

Departmental costs tend to increase substantially with increased departmental emphasis on doctoral work as indicated by the variable, NPHD. Doctors students often require a considerably larger amount of faculty time than do Masters students.

Departments with large graduate student enrollments tend to show lower costs than do small departments, as indicated by the negative sign for the variable, SIZE. Department costs in Chemistry seem to decrease somewhat with increase in sponsored research funding, SPONR. However, the inverse indication for Biochemistry is probably not significant in view of the large standard deviation found for SPONR in this field (Table 10-4). Devotion to graduate work of a larger proportion of the total student credit hours, GSCH, seems to increase departmental costs only slightly if at all.

The peer ranked status of a department, ROOSA, and whether the department is associated with a public or a private institution, TYPE, seems to have little or no significant influence on unit departmental costs.

The ranking of institutions in order of departmental costs for each of the fields studied indicated that a few institutions maintain relatively high or low cost departments with some consistency, but no strong trend was evident.

10.3 Average Program Total Costs Per Awarded Degree

Estimated costs per awarded Doctors degree, which are costs in addition to those of the first or Masters year of graduate work, and also per awarded Masters degree, are shown in Figure 10.3.

Doctors degree costs may be summarized as follows: Biochemistry, (5), 28, 58, 72; Chemistry, (9), 27, 34, 45; Economics, (8), 16, 24, 27; English, (9), 11, 18, 22; Mathematics, (8), 25, 33, 39; and Psychology, (9), 16, 26, 34, where: first, the number of departments studied is shown within brackets; then the lower quartile, the mean, and the upper quartile costs in thousands of dollars per doctoral degree are shown with the mean cost underlined. Costs per awarded Masters degree are quite variable for the reasons stated below and also, because first-year students in some fields such as Chemistry at some institutions do not take the Masters degree but simply proceed directly with doctoral study.

The rankings by field of costs per awarded Doctors and Masters degrees fall in about the same order as reported above for the per enrolled student annual costs.

Three quite different factors contribute to the costs per awarded degree; the quality of the program, the duration of the program, and the selectivity of admissions.

Costs of compensation of faculty and other personnel comprise the major proportion of departmental and total program costs. These inevitably are higher for those departments which recruit and maintain the best available teachers and researchers as faculty members.

For a graduate program of a given quality and total cost, the number of enrolled graduate students controls the cost per graduate student, or the unit cost. Unit annual costs shown above for different departments in the same field vary widely, seemingly because of differing policies with respect to the numbers of graduate students admitted and enrolled.

Unit annual costs and also the quality of the program should be higher as the number of enrolled graduate students per graduate faculty member decreases, because individual graduate students presumably receive larger amounts of faculty time.

Considering unit costs per awarded degree, the duration of the program, on the average differs considerably among the fields and departments studied. No particular relationship seems evident between duration and quality of a program although economically it is obviously desirable that the time period required to complete the program should be as short as practicable.

Admission policies and practices are also of importance. Highly selective admissions should give rise to a low dropout rate and presumably to a relatively low costs per awarded degree. However, if admissions are less selective and enrollment and total program costs are held constant, dropouts will tend to be higher, degree awards lower, and the costs per awarded degree should be relatively higher. Much more information is needed concerning the numbers of graduate students who do not complete their degrees and the reasons for these dropouts.

Overall the cost per awarded degree for a particular graduate program reflects the influence of several different factors. High costs per awarded degree for a particular program may result from the maintenance of an excellent faculty, relatively small numbers of graduate students per faculty member, moderate time periods for completion of the program, and moderate selectivity in admitting students who will probably be able to complete the program.

On the other hand high costs may result from the maintaining of a mediocre faculty, inefficiently small numbers of graduate students per

per faculty member, inordinately long time period[illegible]ciated with completion of the program, and unselective admissions [illegible] results in higher dropout rates.

One further difficulty with the concept of the cost per awarded degree is that it implies that the education of graduate students who do not complete degree programs is worthless and the only valid output the completed degree. We believe that the education of those who do not complete degrees is valuable and that the cost of producing completed degrees should not include the cost, at least not the full cost, of educating those who do not receive degrees.

Our conclusion is that the total annual costs per enrolled graduate student is a much better way to express unit cost than is the total cost per awarded degree.

10.4 Incremental Costs

The incremental effect of increasing or decreasing the number of graduate students is immediately apparent when unit costs are considered, and the wide variations now reported for individual departments seem to be the results mainly of different departmental or institutional policies and practices with respect to allocation of faculty time to graduate education and scholarly activity, and to numbers of graduate students accepted for enrollment in a department.

However, when total costs are considered, the main incremental effect is associated with increase or decrease in the number of departmental faculty. Figure 6-9 shows that the average annual expenditure across all fields and institutions studied amounts to around $25,000 per faculty member for the category of instruction and departmental research, and addition of institutional support costs will substantially increase this figure. Thus significant changes in total program costs are associated with incremental changes in numbers of faculty members rather than in numbers of enrolled graduate students. If a department offering a Masters program undertakes to offer a Doctors program, a major incremental increase in total graduate program costs may be expected because additional numbers of more expensive faculty members will probably be needed.

10.5 Costs to Students

We have not studied the costs incurred by students who attend graduate school but these are substantial and are made up of three main elements,

tuition and fee costs, displacement costs - the difference in living costs when attending versus not attending graduate school, and "opportunity" or "foregone" income costs.

Generally, graduate students have opportunities for employment which are alternatives to proceeding with graduate study. By foregoing the potential income from such employment, the graduate student incurs a substantial cost which may amount to many thousands of dollars over the several years required to complete the doctoral degree. Thus each graduate student makes a major personal investment in his or her future hoping for increased income and other benefits as returns from the investment.

The magnitude of a graduate student's costs, and particularly the foregone income costs, may be importantly related to the costs and quality of graduate degree programs, and further studies of these significant matters are needed.

10.6 Simplification and Application of Gradcost Procedures and Concepts

The information assembled and presented in this study concerning the nature, the relative importance, and the methods considered for estimation of the costs of graduate degree programs has provided a perspective for suggesting the following simplifications be made when Gradcost procedures are to be applied to estimation of graduate program costs within a particular institution or system: (a) it is preferable to estimate annual costs per graduate student, rather than annual costs per Masters or Doctors students or per awarded graduate degree, because annual costs per graduate student can be approximated considerably more reliably and usually may be more meaningful; (b) student appointment costs, chargeable to graduate programs as presently proposed, are relatively small and may be neglected or else approximated at some appropriate fraction of departmental costs per graduate student; and (c) institutional support costs may be significant but within a given university, it should be possible to approximate Library, Student Services, and General costs per graduate student roughly independent of discipline, and to estimate generalized Plant Operation and Maintenance costs per graduate student in some small number of categories such as the laboratory and the non-laboratory disciplines, etc.

With these simplications, and using parent department data in the COMPCUT method along with the Crossover Analysis or the Typical Program approach, estimates of annual cost per graduate student can be made rapidly and easily once arrangements for data collection and computation are routin-

inized within a particular institution or system.

It is hoped that the methods and results now reported will help persons generally interested in graduate education to gain an improved understanding of the nature of its costs and the components of these costs.

Administrators and trustees with general university responsibilities, members of State Legislatures and the Congress, and State and Federal officials who have special concerns with graduate study and research, may find interest in the concepts of graduate education described herein, as well as the types and ranges of its costs.

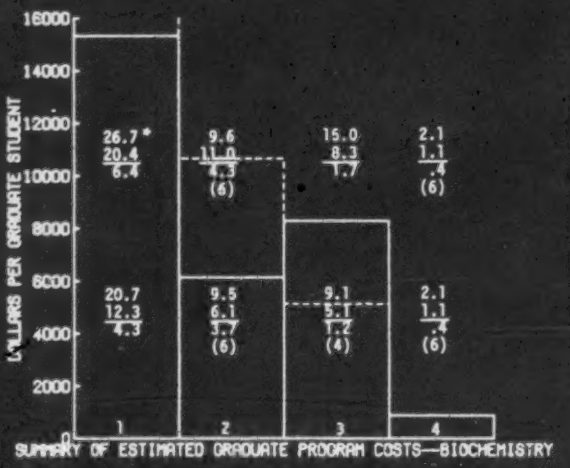
Academic officers, and especially those who are engaged in specific budgeting and planning activities relating to graduate study and research, may find rather directly useful some of the Gradcost estimating procedures, and especially with the simplifications stated above. The cost-modeling equation, tentative and preliminary as it is, may provide a helpful basis within an institution or a system for comparison of programs, and for the correlation of departmental characteristics and costs. The COMPCUT-TP scheme, whereby departmental costs are estimated from a typical program of study by a graduate student, may assist in forecasting costs for proposed new graduate degree programs.

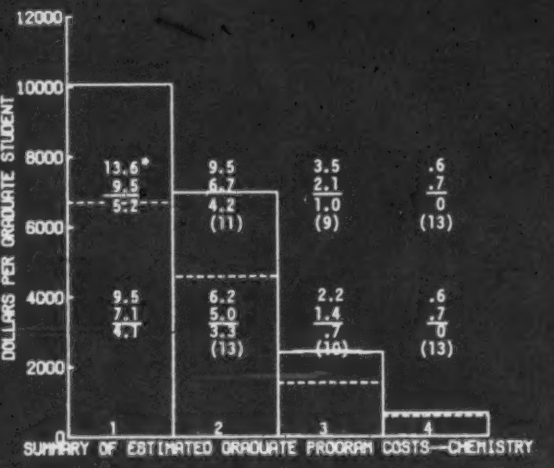
Departmental chairman may be able to manage affairs more effectively if offered a broader understanding of graduate program costs.

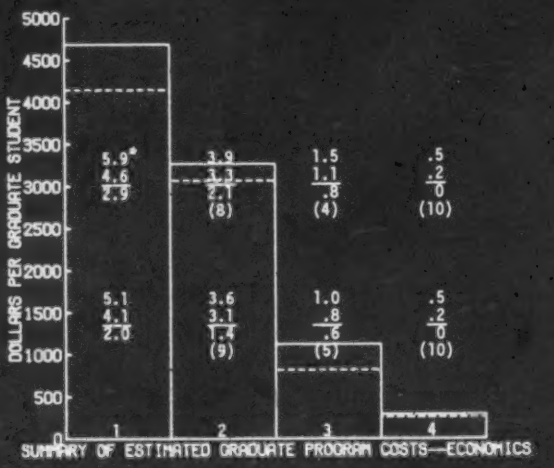
10.7 Suggestions for Future Studies and Activities

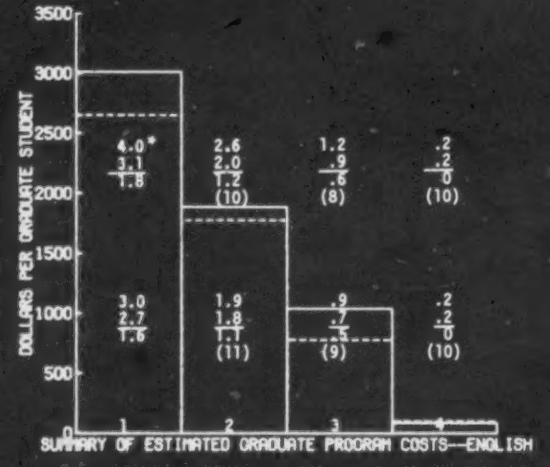
Finally, we hope that researchers will find in this study a useful base on which to build future investigations relating to the costs and benefits of graduate education and university research. To us it appears that inquiries are needed particularly to seek answers and to encourage action in relation to such questions as the following:

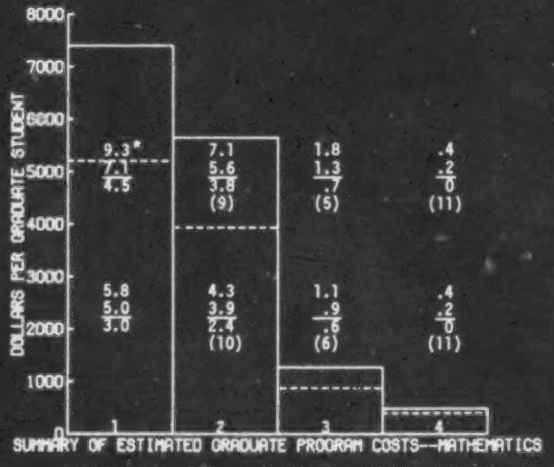
- How can a wider acceptance be gained among academic institutions of uniform definitions of important fiscal and academic terms?
- How can the validity of the Faculty Activity Analysis be improved?
- How can Student Credit Hour representations be improved for individual student-faculty interactions such as in Independent Study and Research, Masters thesis and Doctors dissertation work?
- What relationships prevail between doctoral program costs and sponsored research expenditures?
- Are the now-proposed interrelationships among departmental cost variables valid among a larger sampling of fields and institu-











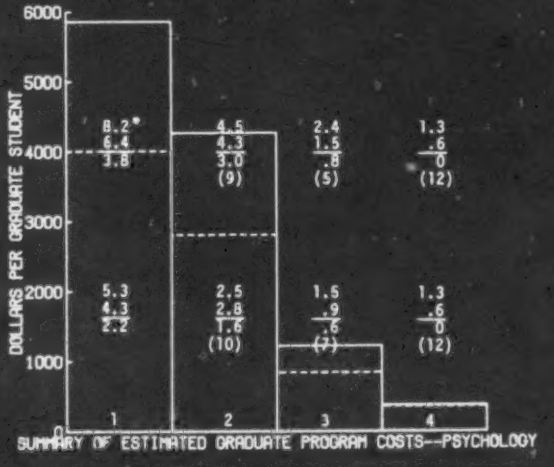


FIGURE 10-1: COSTS PER MASTERS AND DOCTORS STUDENT PER YEAR

1 = TOTAL 2 = DEPARTMENTAL 3 = INSTITUTIONAL SUPPORT

4 = STUDENT APPOINTMENTS (—— DOCTORS; ----- MASTERS)

(* Thousands of Dollars)

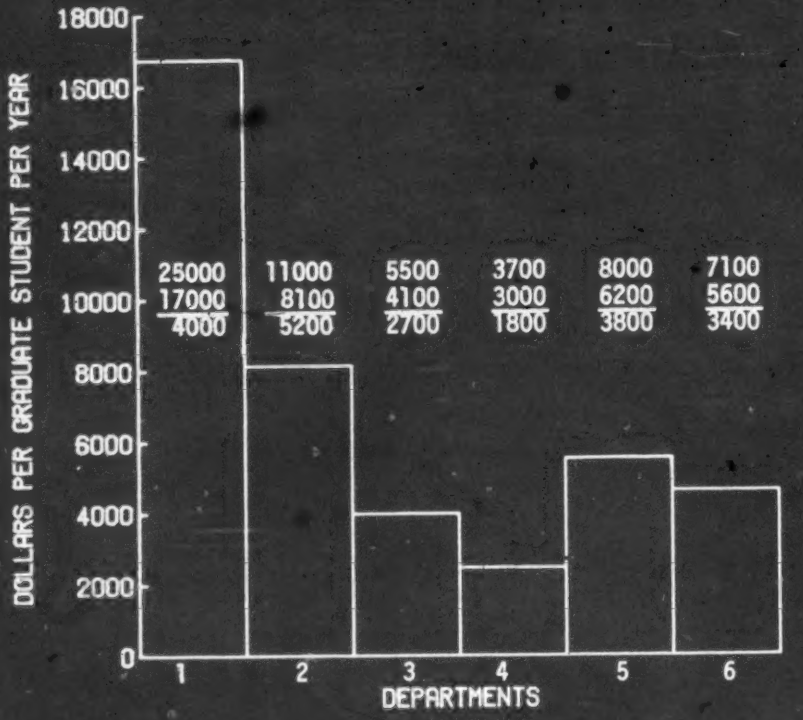


FIGURE 10-2: COSTS PER GRADUATE STUDENT PER YEAR

1 = BIOCHEMISTRY 2 = CHEMISTRY 3 = ECONOMICS

4 = ENGLISH 5 = MATHEMATICS 6 = PSYCHOLOGY

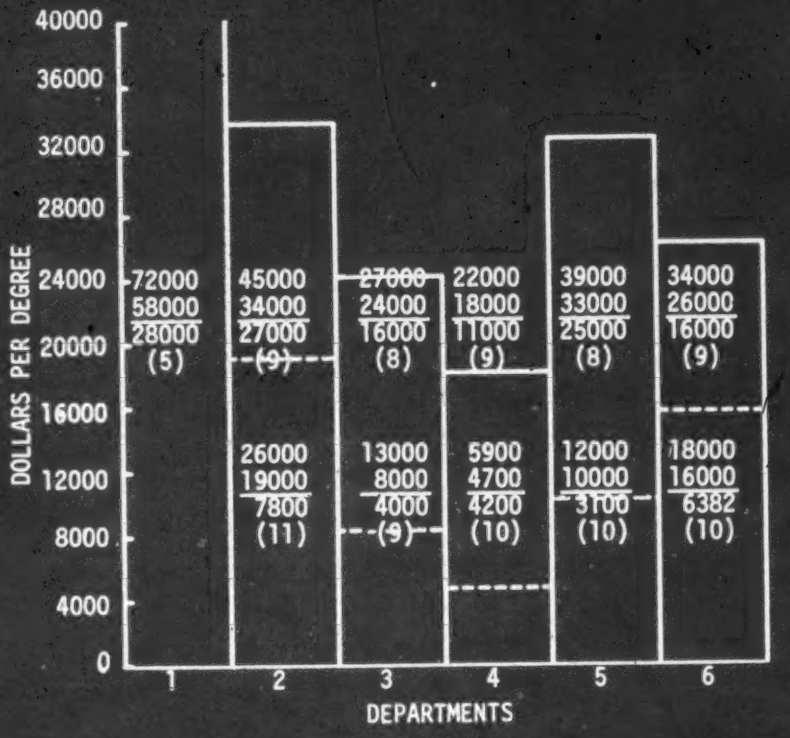


FIGURE 10-3: COSTS PER AWARDED DEGREE

1 = BIOCHEMISTRY 2 = CHEMISTRY 3 = ECONOMICS

4 = ENGLISH 5 = MATHEMATICS 6 = PSYCHOLOGY

(——— DOCTORS; ----- MASTERS)

tutions? Are alternate or additional variables significant?

- What correlations can be found between the cost and the quality of graduate programs?
- What are the effects on undergraduate instruction and cost of the quality and level of expenditures for graduate degree programs?
- How can foregone opportunity costs for graduate students be estimated and what do such costs amount to in representative academic fields?

11. SUMMARY

The objectives of this Gradcost III investigation have been to study alternative methods for estimating the costs of programs leading to Masters degrees and Doctor of Philosophy degrees, to identify relatively simple cost estimation procedures which can be carried out based on definitions prevailing and data available in most graduate schools in the United States; and to apply the developed procedures to data collected from a number of universities and colleges in the United States in order to generate estimates of the costs of graduate programs in the fields of Biochemistry, Cell Biology, Chemistry, Economics, English, Mathematics and Psychology.

11.1 Definitions

As a conceptual base for the study, a university or college has been visualized as carrying out three main programs; instruction, research, and public service. Instructional programs include those leading to the degree of Bachelor, Master, and Doctor of Philosophy, and the latter two are of primary interest. Research programs are seen as closely related to and usually extensively overlapping with instructional programs, and especially those leading to the Doctors degree. Public service programs are often separately funded, and these are of minor interest in the present study. Institutional funds are considered in two categories, "unrestricted" and "restricted."

Total program costs are defined as the monies expended by and through a college or university to provide for operation of a particular graduate degree program. Unit costs are obtained by dividing total program costs by the numbers of Masters or Doctors students enrolled in a particular degree program, or by the total number of graduate students associated with the subject department, or by the number of Masters or Doctors degrees awarded in relation to the program.

11.2 Procedures: Departmental Costs

To estimate graduate degree program costs, data were collected mainly from institutional annual reports, and by use of questionnaires. Total program costs were considered to consist of three elements; departmental costs, institutional support costs, and graduate student service appointment costs. Of these, the first is the most important.

Several alternative procedures for allocating funds from departmental budgets to departmental Doctors, Masters and Bachelors programs were studied. According to one method (CLASSCUT), allocations were made to programs based upon the majority student clientele for the classes offered by departmental faculty. In the second method (CREDCUT), student credit hours provided the basis. A third method (COMPCUT), which is described below, gave results which in a number of cases were similar to those ob- by the CLASSCUT procedure. The CREDCUT approach gave estimated costs which were much lower.

It was concluded that COMPCUT would be the most useful procedure for estimating departmental costs. COMPCUT is based mainly on data derived from Faculty Activity Analyses (FAA), from Crossover Analyses (XOA), from departmental statistics, and from Student Credit Hour (SCH) information relating to five levels of instruction: lower division (LD) and upper division (UD) undergraduate classes, graduate classes (GC), independent study and Masters thesis (ISTH), and Doctors dissertation (DISS). Generally departmental budget funds were allocated to a particular instructional level based upon the proportion of faculty time reported by the FAA to be devoted to that level. With special treatment of scholarly activity costs, these by-level total costs were divided by the number of SCH generated at each level to secure by-level costs per SCH which were multiplied by the appropriate numbers of SCH taken by all the students in a subject program, and then summed by level to obtain the total program costs. Dividing this sum by the number of enrolled students or awarded degrees gave the estimated unit departmental costs.

In general, this COMPCUT procedure was found to be applicable to data assembled from the participating institutions in the several fields studied. Its main weaknesses lie in the limited reliability of the FAA at graduate levels of instruction, and the difficulty in securing consistent reporting of SCH for the individual student-professor contacts such as

those which occur in independent study and research, Masters thesis, and Doctors dissertation activities.

11.3 Procedures - Institutional Support and Student Appointment Costs

Costs of institutional support for departmental programs were approximated by multiplying or dividing total annual institutional expenditures for libraries, student services, plant operation and maintenance and general institutional and administration activities by certain factors called "proxies" and, in some cases, applying "weighting factors." For example, institutional expenditures for student services were divided by the total number of students enrolled in the institution to obtain the estimated costs of student services per student enrolled in a departmental Doctors or Masters program. In general, these procedures were found to be satisfactorily workable to provide useful approximations Although the weighting factors used sometimes may desirably be chosen differently for individual fields and/or institutions.

For each department studied, data concerning student appointment expenditures for fellowships, traineeships, teaching assistantships, and research assistantships were collected. Tuition waivers were not included as cost elements. The other named expenditures were summed and then recorded on a per graduate student basis so as to show the level of financial support available to assist in the recruitment and maintenance of graduate students. It was concluded that only those expenditures made in favor of fellowships, traineeships, and research assistantships supported by unrestricted funds, should be included as graduate degree program costs. In most cases these monies were relatively small.

11.4 Estimated Research Program Costs

In view of the major importance of faculty and graduate student research activity in relation to graduate degree programs, the Research Program expenditures were estimated, considering certain expenditures made from unrestricted departmental funds, and those made from restricted sponsored research funds. The sum of these was taken to be an estimate of the monies used to support the Research Program of the department. However, this sum is much less than the replication costs of the total departmental Research Program because no recognition is given to investigational activities which are conducted without stipends by students working on their Masters theses and Doctors dissertations.

The estimated total Research Program expenditures were divided by the numbers of faculty members, and the numbers of graduate students, to obtain unit expenditures. Total research expenditures per faculty member per year varied widely in the individual departments studied, but on the average were largest in Biochemistry, substantial in Chemistry and Economics, considerably less in Mathematics and Psychology and smallest in English. Department research expenditures were similar in the several fields, but sponsored research monies ranged from high values for Biochemistry and Chemistry, through medium values for Economics, Mathematics and Psychology, down to almost zero in English. Research Program expenditures per graduate student showed a similar rank order.

Although a close relationship between sponsored research and graduate education is recognized, it was concluded that sponsored research costs should not be included as elements of the costs of graduate programs.

11.5 Estimated Graduate Degree Program Costs

Per graduate student enrolled in a department, the estimated average annual costs, which are underlined, (and are preceded and followed by the lower and upper quartile costs, respectively) are the following: Biochemistry, 4,400, 18,000, 25,000; Chemistry, 5,200, 8,100, 11,000; Economics, 2,700, 4,100, 5,500; English, 1,800, 3,000, 3,700; Mathematics, 3,800, 6,200, 8,000; and Psychology, 3,400, 5,600, 7,100.

The estimated average annual costs per Doctors student and per Masters student in a department fall into about this same rank order, and annual costs are substantially higher for Doctors versus Masters students. Costs per awarded Doctors and Masters degree followed similar trends, but these could not be related to annual costs because information was not available concerning the fraction of enrolled graduate students who do not complete degree programs, and also the average times of study required to complete degree programs.

Estimated annual departmental costs per graduate student (DCOST) vary widely among individual departments in a particular field. Departmental costs were correlated insofar as possible with certain departmental and institutional characteristics. Depending upon discipline, somewhat different characteristics show moderate or strong correlations with costs.

Increase in the cost of faculty time devoted to graduate study and

research per graduate student (FACT), and increase in the proportion of doctoral aspirants among the enrolled graduate students (NPHD), correlate with increase in unit departmental costs in most cases. Increase in the number of graduate students enrolled in a department (SIZE) usually is associated with modest decrease in unit cost. Other variables show weak or negligible relationships. No significant correlations were found between costs and the Roos-Anderson peer ranking of the "quality" of a department, or whether the department was associated with a public or a private university. Multiregression analyses were carried out to obtain a model equation which related DCOST, in some cases moderately well, with FACT, NPHD, SPONR, and SIZE.

11.6 Simplification and Application of Gradcost Procedures

Simplified Gradcost procedures for estimating graduate degree program costs are suggested, and these may be broadly applicable using data now available in many graduate schools.

12. RECOMMENDATIONS

We recommend:

12.1 That this report be distributed as widely as possible to persons interested in graduate education with the hope that the described procedures and findings will be helpful to them in understanding and evaluating the nature and relative importance of the main elements of costs of graduate degree programs.

12.2 That consideration be given to the establishment of arrangements by which the CGS and/or other appropriate institutions, could provide advice and assistance to representatives of colleges and universities interested in developing estimates of the cost of their graduate programs using concepts and procedures such as those developed and tested in this present study.

12.3 That all organizations concerned with academic institutions be encouraged to move forward toward development of generally accepted definitions and data collecting and reporting procedures relative to both academic and financial aspects of graduate degree programs.

12.4 That further investigations be carried out to refine the concepts and procedures developed so far in the Gradcost studies and to test the improved methods using a broader sampling of disciplines and larger numbers of departments and institutions.

12.5 That additional studies be carried out to develop estimates and procedures for estimating the costs (and especially including foregone opportunity costs), incurred by graduate students because this type of information is needed to complement the estimates made in the present study of the costs incurred by colleges and universities offering graduate degree programs.

12.6 That further work be done to better identify the benefits arising from the functioning of graduate degree programs, the values associated with these benefits, and the identity of the beneficiaries.

Respectfully submitted,

Joseph M. McCarthy, Ph.D.

William D. Garrison, Ph.D.

Seattle, Washington
1 June 1978

THE COSTS AND BENEFITS OF GRADUATE EDUCATION

ESTIMATION OF GRADUATE DEGREE PROGRAM COSTS

SUPPLEMENT WITH DETAILED PROCEDURES AND ILLUSTRATIVE CALCULATIONS

by

Joseph L. McCarthy and William D. Garrison

THE COUNCIL OF GRADUATE SCHOOLS

IN THE UNITED STATES

Funded in part by the National Institutes of Health, Grant No. NO-1-RG-4-2176

Awarded to the Countil of Graduate Schools in the United States

30 June 1974

The Council of Graduate Schools/Washington, D.C./June 1978

Inquiries concerning additional copies of the parent report and of companion documents should be addressed to the Council of Graduate Schools in the United States, 1 Dupont Circle, Washington, D.C. 20036.

The parent report is:

The Costs and Benefits of Graduate Education:
Estimation of Graduate Degree Program Costs

by Joseph L. McCarthy and William D. Garrison,
The Council of Graduate Schools, 1978.

Preparation of these papers was carried out in the course of research sponsored by Grant Number NOI-RG-4-2176 of the National Institutes of Health and by the Council of Graduate Schools.

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PREFACE***

Studies on costs and benefits of graduate education were begun in 1968 in response to a resolution adopted at the Annual Meeting of the Council of Graduate Schools in the United States (CGS). Two investigations have been completed, and a number of papers have been published as described in the introductory paragraphs of the present report.

This "Gradcost III" study was initiated in 1974 with the assistance of a grant of $186,432 by the National Institutes of Health.

General guidance for the project has been provided by the Gradcost III Committee:

*David R. Deener, Chairman
Tulane University

**J. Chester McKee
Mississippi State University

Charles Lester
Emory University

S. D. Shirley Spragg
University of Rochester

Joseph L. McCarthy
University of Washington

J. Boyd Page
Council of Graduate Schools

*Deceased, 1976. **CGS Chairman - 1977. CGS Chairmen who served in prior years as members of the Gradcost III Committee are: Sanford E. Elberg, University of California-Berkeley; S. D. Shirley Spragg; and Jacob E. Cobb, Indiana State University.

The CGS made contracts with the University of Washington where Drs. Joseph L. McCarthy and William D. Garrison of Washington functioned as Director and Associate, respectively, for the study, and with Tulane University where Dr. David R. Deener served as Co-director. Following the untimely death of Dr. Deener, the work was completed at Washington.

As initial step a number of colleges and universities electing to participate in the study were identified and, an academic and fiscal officer from each institution served as members of an Advisory Committee.

***This is the Preface to the parent GRADCOST III Report.

Participating institutions and Advisory Committee members included the following:

Brown University
Ernest S. Frerichs
William Wright

Emory University
Charles T. Lester
Raymond C. Otwell, Jr.

Indiana State University
Mary Ann Carroll
Donald Hilt

Indiana University
Harry G. Yamaguchi
James King

Kansas State College at Pittsburg
J.D. Haggard
Clifford E. Bougher

Tufts University
Charles G. Nelson
Jack Dunn

Tulane University
David R. Deener
Jess B. Morgan

University of Iowa
D.C. Spriestersbach
James F. Jakobsen

University of Texas
William F. Lasher
Irwin Lieb

University of Washington
Morgan D. Thomas
Robert Thompson

University of Wisconsin
Robert M. Bock
Peter Bunn

Members of the Advisory Committee made important contributions to the study by arranging for responses to questionnaires, by attending meetings to discuss progress of the investigation, by commenting on drafts of reports, and in many other ways.

Institutions requested that the data and information relating to individual institutions be considered confidential. This request has been carefully respected.

The results of the Gradcost III activity are presented in two papers:

The Costs and Benefits of Graduate Education:
Estimation of Graduate Degree Program Costs
by Joseph L. McCarthy and William D. Garrison

The Costs and Benefits of Graduate Education
Estimation of Graduate Degree Program Costs -
Supplement with Procedural Details and
Illustrative Calculations
by Joseph L. McCarthy and William D. Garrison

The second paper is being offered as a record document to the Educational Resources Information Center (ERIC), Washington, D.C., 20202.

The Council trusts that these reports do make important contributions to the understanding and development of concepts and procedures for estimation of the costs of graduate education. Specific estimates of costs have been made, but we emphasize that these are included simply to illustrate the utility of the developed concepts and procedures. The report sets forth a number of recommendations which we hope will be carefully considered by those having an interest in this complex and important subject.

This statement has been endorsed in principle by the Executive Committee of the Council of Graduate Schools in the United States. It is not an official statement of the CGS, nor of any of the individual colleges or universities participating in the study. The authors carry personal responsibility for the contents of the reports.

Significant contributions have been made by representatives of the National Institutes of Health; by Dr. Stephen Hatchett prior to his death in September, 1976, and thereafter, by Dr. Carl D. Douglass, Jr.

To all of the many persons associated with departmental, institutional research, fiscal, graduate school, and other offices of the colleges and universities participating in the study, gratitude is expressed for their indispensible help and advice.

The leadership of the late Dr. Deener in helping to initiate the project, and in collaborating with Drs. McCarthy and Garrison in advancing the investigation up until his death, is deeply appreciated by his many friends and associates within and outside of the CGS.

The continuing involvement and wise counsel of those who have served on the Gradcost III Committee is gratefully acknowledged.

Finally, the Council is particularly appreciative of the major contributions of Joseph L. McCarthy and William D. Garrison in carrying this significant study through to completion and publication.

J. Boyd Page

J. Boyd Page, President
Council of Graduate Schools
in the United States

THE COSTS AND BENEFITS OF GRADUATE EDUCATION[1a, 1b]

ESTIMATION OF GRADUATE DEGREE PROGRAM COSTS

SUPPLEMENT WITH DETAILED PROCEDURES AND ILLUSTRATIVE CALCULATIONS

by

Joseph L. McCarthy [1c] and William D. Garrison[1d]

1. INTRODUCTION

For the last several years, the Council of Graduate Schools in the United States has sponsored studies on costs and benefits of graduate education, and these studies have been given substantial assistance by grants from the National Science Foundation and the National Institutes of Health.

The most recent work has been published in 1978 under the title of "Estimation of Graduate Degree Program Costs" by Joseph L. McCarthy and William D. Garrison. This report describes the general nature of the problem of estimation of costs of graduate education reviews, and sets forth conclusions with respect to a number of alternative procedures for estimating such costs, and then applies selected procedures to develop estimates of graduate degree program costs for the fields of Biochemistry, Cell Biology, Chemistry, Economics, English, Mathematics and Psychology based on data collected from some fourteen different colleges and universities.

A summary of this work is given in Appendix S.

In carrying out the study, it was necessary to consider a number of

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[1a] The parent report has been endorsed in principle by the Executive Committee of the Council of Graduate Schools in the United States. However, it is not an official statement supported by the university with which the authors are associated, nor by any of the colleges and universities which have participated in the present study. The authors carry personal responsibility for the content of the reports. [1b] For the important advice and assistance received, the authors are deeply grateful to our deceased friends and colleagues, Drs. David R. Deener and Stephen Hatchett; to each of the members of the CGS Gradcost Committee and the Advisory Committee; to the departmental, research, fiscal and graduate school officers of the several participating colleges and universities; and to the National Institutes of Health which provided funds to assist in its support, J.L.M. and W.D.G.
[1c] Dean Emeritus of the Graduate School and Professor of Chemical Engineering and Forest Resources, University of Washington. [1d] Research Associate, University of Washington, Seattle, Washington.

important matters in more detail than could be set forth in the subject report. Thus this Supplement has been assembled for the benefit of interested persons to record information concerning the Glossary used (Appendix G), the text of the Questionnaires employed (Appendix Q), the procedures applied for estimation of costs (Appendix A), illustrative calculations whereby these procedures are applied (Appendix C), and the approaches and results of data correlation (Appendix R), as set forth more specifically in the Table of Contents.

2. GLOSSARY

As the Gradcost III investigation got underway, it became clear that definitions in some cases did not exist, and in other cases were not applied with consistency to certain terms of primary interest in estimating the costs of graduate education.

Thus, one of the first steps taken in the proceeding with the investigation was to develop a "glossary" of words which had important significance in the study. Such a list was prepared by the authors in preliminary form and then discussed with our Advisory Committee until a final wording was found which was acceptable to all or most of the participants.

This wording is set forth in the Glossary which comprises Appendix G.

A number of acronyms and abbreviations have been used to save space in the main report, and these are briefly described in Table 1.

3. QUESTIONNAIRES

Two main types of information or data were collected in carrying out the present study.

One consisted of overall institutional information such as that given forth in annual academic and fiscal reports and copies of such reports were received from all participants along with additional telephoned data.

Other data, both for institutions and for specific departments of interest were collected by the use of the questionnaires, and the text of these is Appendix Q.

The several questionnaires were completed by academic and fiscal representatives of the participating colleges and universities and then returned

TABLE 1

SIGNIFICANCE OF CERTAIN ACRONYMS AND ABBREVIATIONS

CGS	Council of Graduate Schools in the United States
CLASSCUT	Procedure for Estimation of Departmental Costs
COMPCUT	Procedure for Estimation of Departmental Costs
COMPCUT-MD	Procedure for Estimation of Departmental Costs - Multidepartmental
COMPCUT-TP	Procedure for Estimation of Departmental Costs - Typical Program
CREDCUT	Procedure for Estimation of Departmental Costs
DCOST	Annual Departmental Costs per Graduate Student
DISS	Dissertation for the Doctoral Degree
ECE	Equal Credit Equivalent
ERIC	Educational Resources Information Center
FAA	Faculty Activity Analysis
FACT	Faculty Cost per Graduate Student per Year
FTE	Full Time Equivalent
GC	Graduate Classes
GSCH	Graduate Credit Hours per 1000 Department Total
GRADCOST	CGS Project Studying Graduate Program Costs
IS	Independent Study
ISTH	Independent Study and Masters Thesis
LD	Lower Division, i.e., Freshmen and Sophmores
NIH	National Institutes of Health
NPHD	Number of Ph.D's Awarded Annually per 1000 Graduate Students
NSF	National Science Foundation
Ph.D.	Doctor of Philosophy
R	Ratio of FAA Teaching to SCH
ROOSA	Decile Ranking of Department by Peer Appraisal
SA	Scholarly Activity
SCH	Student Credit Hours, Usually Semester
SIZE	Number of Graduate Students Enrolled in a Program
SPONR	Sponsored Research Funds Per Faculty Member Per Year
TA	Teaching Assistant
TH	Masters Thesis
TYPE	Public or Private Institutions
UD	Upper Division, i.e., Juniors and Seniors
UG	Undergraduate
XOA	Crossover Analysis

to the writers. Data were coded on computer cards, printouts were made, and returned to the appropriate institutional representatives for verification. Corrected questionnaire responses have been retained in the Gradcost III files.

Two rounds of questionnaires were transmitted. Institutional and departmental questionnaires were sent out on November 20, 1975, and returned over the next several months. Questionnaires dealing with grant and contract research and related matters were sent out in April, 1976, and returned during the next several months. In many cases, telephone contacts were made to assist institutional representatives to complete the questionnaires and to verify responses.

4. PROCEDURES FOR ESTIMATION OF COSTS

During the time that the Questionnaires were being prepared, and responses were being received, verified, and coded, the authors were at work studying and developing alternative procedures for estimation of the costs of the graduate programs.

It soon became apparent that four main elements of costs needed to be considered: departmental costs, institutional support costs, student appointment costs, and costs of research activities supported by unrestricted and/or restricted funds.

Further study indicated that the departmental costs are the most important element of the total cost of graduate work, and thus special attention was devoted to development of procedures for allocating monies from the departmental budgets to Masters Degree program costs and Doctors Degree program costs.

After much consideration, as well as extensive discussion with members of the Advisory Committee, five different procedures were developed for estimation of departmental costs, and these are identified by acronyms: CLASSCUT, CLADCUT, CREDCUT, FACTCUT, AND COMPCUT. Each procedure is described in detail in a sequential fashion in Appendix A.

After comparing these procedures with respect to assumptions, needed data, clarity of definitions, facility of application, etc., it was concluded that the COMPCUT held out the best prospect of being generally useful.

The second significant element of cost is extra-departmental institutional support to provide for libraries, student services, plant operation maintenance, and general expenses of the university. The third main element was taken to be the student appointment costs for Fellowships, Assistantships, Scholarships, Traineeships, and the like. Detailed statements of procedures for carrying out these estimates are also given in Appendix A.

The costs of activities in the departments were considered, including research supported by the unrestricted monies of the college or university and also sponsored research funds which are restricted. Procedures were developed and applied to estimate the total departmental Research Program expenditure, and these methods also are given in Appendix A.

Finally, the estimated departmental costs, institutional support costs and student appointment costs were added together to secure total graduate degree program costs as well as unit costs.

5. ILLUSTRATIVE CALCULATIONS

To illustrate these procedures, detailed calculations have been carried out for graduate work in Chemistry at Learned University. Made up data for certain general characteristics of the institution as well as of the Chemistry Department are given in Table 2. The calculations are given in detail in Appendix C.

Chemistry was selected as the illustrative field because: Chemistry programs are offered at almost all universities throughout the United States, Canada, and overseas; Masters programs almost always coexist with Ph.D. programs; chemistry graduates find employment in widely differing areas including academic, governmental, and industrial situations; sponsored or grant and contract research awards from both public and private sources are widespread in the field of chemistry; and graduate student appointments such as Teaching Assistantships, Research Assistantships, Fellowships, Traineeships, and Scholarships, and tuition waivers are often made in this field.

Illustrative calculations for Chemistry at Learned University have also been carried out to estimate institutional support costs, student appointment costs, total and unit graduate program costs, awarded graduate degree costs, as well as departmental and sponsored research costs.

TABLE 2

SOME STATISTICAL CHARACTERISTICS OF THE FICTITIOUS LEARNED UNIVERSITY AND ITS CHEMISTRY DEPARTMENT

Total Institution Characteristics:

Total Students, Fall Term 1973	34,524
Graduate & Professional Students, Fall Term 1973	7,809
Number of Faculty	2,376
Student Credit Hours Taken, Fall Term 1973	458,727 (Qtr.)
Degrees Granted, 1973-74	
Bachelors	5,812
Masters	1,725
Doctors	382
Professional	335
Total Unrestricted Current Funds Expenditures 1973-74	$140,113,349
Total Restricted Current Funds Expenditures 1973-74	$ 72,533,404
Total University Current Funds Expenditures 1973-74	$212,646,753

Chemistry Department Characteristics:

First Year Graduate Students, Fall Term 1973-74	33
Advanced Years Graduate Students, Fall Term 1973-74	78
Number of Faculty	30
Student Credit Hours Taken, Fall Term 1973	19,080
Degrees Granted, 1970-74	
Bachelors	261
Masters	57
Doctors	84
Departmental Unrestricted Funds Expenditures 1973-74 (Other than Summer Term)	$ 1,476,218
Grants and Contracts Expenditures 1973-74 (Direct Costs only):	$ 508,071

7. CORRELATIONS

Correlation of departmental costs with certain characteristics of departments and institutions have been carried out and some details concerning these calculations and results are given in Appendix R.

8. CLOSING COMMENT

The input data assembled for all cost estimations carried out has been coded onto computer cards and will be preserved as long as feasible so that additional machine calculations may be made if deemed useful in the future.

Respectfully submitted,

30 June 1978
Seattle, Washington

Joseph L. McCarthy, Ph.D.

William D. Garrison, Ph.D.

APPENDIX S
SUMMARY OF
PARENT REPORT

SUMMARY
of
THE COSTS AND BENEFITS OF GRADUATE EDUCATION
ESTIMATION OF GRADUATE DEGREE PROGRAM COSTS

The objectives of this Gradcost III investigation have been to study alternative methods for estimating the costs of programs leading to Masters degrees and Doctor of Philosophy degrees, to identify relatively simple cost estimation procedures which can be carried out based on definitions prevailing and data available in most graduate schools in the United States; and to apply the developed procedures to data collected from a number of universities and colleges in the United States in order to generate estimates of the costs of graduate programs in the fields of Biochemistry, Cell Biology, Chemistry, Economics, English, Mathematics and Psychology.

Definitions

As a conceptual base for the study, a university or college has been visualized as carrying out three main programs; instruction, research, and public service. Instructional programs include those leading to the degree of Bachelor, Master, and Doctor of Philosophy, and the latter two are of primary interest. Research programs are seen as closely related to and usually extensively overlapping with instructional programs, and especially those leading to the Doctors degree. Public service programs are often separately funded, and these are of minor interest in the present study. Institutional funds are considered in two categories, "unrestricted" and "restricted."

Total program costs are defined as the monies expended by and through a college or university to provide for operation of a particular graduate degree program. Unit costs are obtained by dividing total program costs by the numbers of Masters or Doctors students enrolled in a particular degree program, or by the total number of graduate students associated with the subject department, or by the number of Masters or Doctors degrees awarded in relation to the program.

Procedures: Departmental Costs

To estimate graduate degree program costs, data were collected mainly from institutional annual reports, and by use of questionnaires. Total program costs were considered to consist of three elements; departmental costs, institutional support costs, and graduate student service appointment costs. Of these, the first is the most important.

Several alternative procedures for allocating funds from departmental budgets to departmental Doctors, Masters and Bachelors programs were studied. According to one method (CLASSCUT), allocations were made to programs based upon the majority student clientele for the classes offered by departmental faculty. In the second method (CREDCUT), student credit hours provided the basis. A third method (COMPCUT), which is described below, gave results which in a number of cases were similar to those ob- by the CLASSCUT procedure. The CREDCUT approach gave estimated costs which were much lower.

It was concluded that COMPCUT would be the most useful procedure for estimating departmental costs. COMPCUT is based mainly on data derived from Faculty Activity Analyses (FAA), from Crossover Analyses (XOA), from departmental statistics, and from Student Credit Hour (SCH) information relating to five levels of instruction: lower division (LD) and upper division (UD) undergraduate classes, graduate classes (GC), independent study and Masters thesis (ISTH), and Doctors dissertation (DISS). Generally departmental budget funds were allocated to a particular instructional level based upon the proportion of faculty time reported by the FAA to be devoted to that level. With special treatment of scholarly activity costs, these by-level total costs were divided by the number of SCH generated at each level to secure by-level costs per SCH which were multiplied by the appropriate numbers of SCH taken by all the students in a subject program, and then summed by level to obtain the total program costs. Dividing this sum by the number of enrolled students or awarded degrees gave the estimated unit departmental costs.

In general, this COMPCUT procedure was found to be applicable to data assembled from the participating institutions in the several fields studied. Its main weaknesses lie in the limited reliability of the FAA at graduate levels of instruction, and the difficulty in securing consistent reporting of SCH for the individual student-professor contacts such as

those which occur in independent study and research, Masters thesis, and Doctors dissertation activities.

Procedures - Institutional Support and Student Appointment Costs

Costs of institutional support for departmental programs were approximated by multiplying or dividing total annual institutional expenditures for libraries, student services, plant operation and maintenance and general institutional and administration activities by certain factors called "proxies" and, in some cases, applying "weighting factors." For example, institutional expenditures for student services were divided by the total number of students enrolled in the institution to obtain the estimated costs of student services per student enrolled in a departmental Doctors or Masters program. In general, these procedures were found to be satisfactorily workable to provide useful approximations Although the weighting factors used sometimes may desirably be chosen differently for individual fields and/or institutions.

For each department studied, data concerning student appointment expenditures for fellowships, traineeships, teaching assistantships, and research assistantships were collected. Tuition waivers were not included as cost elements. The other named expenditures were summed and then recorded on a per graduate student basis so as to show the level of financial support available to assist in the recruitment and maintenance of graduate students. It was concluded that only those expenditures made in favor of fellowships, traineeships, and research assistantships supported by unrestricted funds, should be included as graduate degree program costs. In most cases these monies were relatively small.

Estimated Research Program Costs

In view of the major importance of faculty and graduate student research activity in relation to graduate degree programs, the Research Program expenditures were estimated, considering certain expenditures made from unrestricted departmental funds, and those made from restricted sponsored research funds. The sum of these was taken to be an estimate of the monies used to support the Research Program of the department. However, this sum is much less than the replication costs of the total departmental Research Program because no recognition is given to investigational activities which are conducted without stipends by students working on their Masters theses and Doctors dissertations.

The estimated total Research Program expenditures were divided by the numbers of faculty members, and the numbers of graduate students, to obtain unit expenditures. Total research expenditures per faculty member per year varied widely in the individual departments studied, but on the average were largest in Biochemistry, substantial in Chemistry and Economics, considerably less in Mathematics and Psychology and smallest in English. Department research expenditures were similar in the several fields, but sponsored research monies ranged from high values for Biochemistry and Chemistry, through medium values for Economics, Mathematics and Psychology, down to almost zero in English. Research Program expenditures per graduate student showed a similar rank order.

Although a close relationship between sponsored research and graduate education is recognized, it was concluded that sponsored research costs should not be included as elements of the costs of graduate programs.

Estimated Graduate Degree Program Costs

Per graduate student enrolled in a department, the estimated average annual costs, which are underlined, (and are preceded and followed by the lower and upper quartile costs, respectively) are the following: Biochemistry, 4,400, 18,000, 25,000; Chemistry, 5,200, 8,100, 11,000; Economics, 2,700, 4,100, 5,500; English, 1,800, 3,000, 3,700; Mathematics, 3,800, 6,200, 8,000; and Psychology, 3,400, 5,600, 7,100.

The estimated average annual costs per Doctors student and per Masters student in a department fall into about this same rank order, and annual costs are substantially higher for Doctors versus Masters students. Costs per awarded Doctors and Masters degree followed similar trends, but these could not be related to annual costs because information was not available concerning the fraction of enrolled graduate students who do not complete degree programs, and also the average times of study required to complete degree programs.

Estimated annual departmental costs per graduate student (DCOST) vary widely among individual departments in a particular field. Departmental costs were correlated insofar as possible with certain departmental and institutional characteristics. Depending upon discipline, somewhat different characteristics show moderate or strong correlations with costs.

Increase in the cost of faculty time devoted to graduate study and

research per graduate student (FACT), and increase in the proportion of doctoral aspirants among the enrolled graduate students (NPHD), correlate with increase in unit departmental costs in most cases. Increase in the number of graduate students enrolled in a department (SIZE) usually is associated with modest decrease in unit cost. Other variables show weak or negligible relationships. No significant correlations were found between costs and the Roos-Anderson peer ranking of the "quality" of a department, or whether the department was associated with a public or a private university. Multiregression analyses were carried out to obtain a model equation which related DCOST, in some cases moderately well, with FACT, NPHD, SPONR, and SIZE.

Simplification and Application of Gradcost Procedures

Simplified Gradcost procedures for estimating graduate degree program costs are suggested, and these may be broadly applicable using data now available in many graduate schools.

APPENDIX G
GLOSSARY

GLOSSARY
(as amended)

21 March 1975

Academic Year — "A consecutive time period institutionally designated as the academic year. An academic year may be equivalent to a fiscal year or may include only some of the sessions during which course work is offered. Typically an academic year is equated to two semesters, three quarters, two trimesters, or the time period covered by the 4-1-4 plan." N.C.H.E.M.S. Cost Analysis Manual: Field Review Edition, 1974, p. 187.

Advanced Years Graduate Student — A student enrolled in a graduate degree program at your institution who has completed approximately twelve months or more of full-time graduate study or its equivalent at your institution, or equivalent study at another institution.

Compensation — "The total dollar amount, inclusive of gross salaries and fringe benefits, paid directly to or on behalf of personnel. See Salary and Fringe Benefits." N.C.H.E.M.S. Cost Analysis Manual: Field Review Edition, 1974, p. 190.

Course Levels — The institutional categorization for the level of offering of a specific course; the categorization derived from the level of student to which any particular course offering is primarily directed. A multiple-level course should be assigned a course level that best represents the the modal level of the students enrolled in the course.

(1) Lower Division: Courses primarily taken by freshmen and sophomore undergraduates.

(2) Junior Level: Courses primarily taken by junior undergraduates.

(3) Senior Level: Courses that are primarily taken by senior undergraduates, although they may be secondarily taken by first year and advanced years graduate students.

GLOSSARY
(as amended)
(continued)

(4) First Year Graduate Level: Courses that are taken primarily by students beginning graduate work, other than the courses described in parts 6, 7 and 8 below, although they may be secondarily taken by undergraduate and/or advanced years graduate students.

(5) Advanced Years Graduate Level: Courses that are taken primarily by advanced years graduate students, other than the courses described in parts 6, 7 and 8 below.

(6) Independent Study and Research Level: Courses for graduate students that give credit for students' independent study and research, other than the thesis or dissertation courses listed in 7 and 8 below.

(7) Thesis Research and Preparation Level: Courses for graduate students only that give credit for the work done on theses by aspirants to the Master's degree.

(8) Dissertation Research and Preparation Level: Courses for graduate students only that give credit for the work done on doctoral dissertations by aspirants to the Doctor's degree.

Equipment

Capital Equipment. "Those items of movable property (not permanently attached to a structure) that have an acquisition cost of $500 or more and an expected service life that exceeds two years." N.C.H.E.M.S. Cost Analysis Manual: Field Review Edition, 1974, p. 189. This category does not include what N.C.H.E.M.S. terms Noncapital Equipment, that is, "those items of property that have an acquisition cost of less than $500 or an expected service life of less than two years." ibid. p. 199. Noncapital Equipment should be included in the Supplies and Services category.

GLOSSARY (as amended)
(continued)

Fellowships Monies awarded to graduate students for the purpose of encouraging study in the students' fields of interest, with no expectation of repayment by the students in kind or in services.

First Year Graduate Student A student enrolled in a graduate degree program at your institution who has completed less than approximately twelve months of full-time graduate study or its equivalent.

Fringe Benefits "An element of compensation which amy include the items listed below (illustrative only). Fringe benefits should include all benefits paid to personnel, regardless of whether the benefits or equivalent cash options are available to all.

(1) Social Security: If covered by Social Security, include appropriate FICA tax. If covered by an alternate plan, such as Colorado's PERA, include the appropriate payments. (Definition applies to all types of employees.)

(2) Retirement: Include all contributions made to a retirement fund regardless of vesting requirements.

(3) Medical Insurance: Include payments made to provide medical insurance to the employees.

(4) Life Insurance: Include payments made to provide life insurance to the employees.

(5) Guaranteed Disability Income Protection: Include contributions, through insurance or otherwise, for prolonged disability income payments providing such payments do not arise from the accumulation of unused annual sick leave benefits.

(6) Unemployment Compensation: Include payments to be made under the Unemployment Compensation law.

(7) Workmen's Compensation: Include payments to be made under Workmen's Compensation laws."

N.C.H.E.M.S. Cost Analysis Manual: Field Review Edition, 1974, pp. 195-196.

GLOSSARY (as amended)
(continued)

HEGIS Number Categories

The Higher Education General Information System (H.E.G.I.S.) categorizes fields of study into the following discipline divisions:

0100	Agriculture and Natural Resources
0200	Architecture and Environmental Design
0300	Area Studies
0400	Biological Sciences
0500	Business and Management
0600	Communications
0700	Computer and Information Sciences
0800	Education
0900	Engineering
1000	Fine and Applied Arts
1100	Foreign Languages
1200	Health Professions
1300	Home Economics
1400	Law
1500	Letters
1600	Library Science
1700	Mathematics
1800	(not used)
1900	Physical Sciences
2000	Psychology
2100	Public Affairs and Services
2200	Social Sciences
2300	Theology
4900	Interdisciplinary Studies

Number of Courses A "course" is a class unit in a particular subject. If a faculty member teaches two classes with the same title, count that as two courses. If a faculty member teaches one class, count it as <u>one</u> course, even though it may sometimes be divided into several teaching-assistant-monitored sections.

Personnel Classifications:

Faculty Academic appointees with the ranks of associate, instructor, lecturer, assistant professor, associate professor and professor.

Postdoctorate A person with a doctor's degree who receives compensation from the institution for performing instructional or research duties, who is not enrolled in a graduate degree program, and who does not hold a faculty rank.

GLOSSARY (as amended)
(continued)

Personnel, continued:

Research Assistant — A graduate student enrolled in a degree program at the institution, who does not hold a faculty rank, and who receives compensation for assisting in the research of the institution.

Teaching Assistant — A graduate student enrolled in a degree program at the institution, who does not hold a faculty rank, and who receives compensation for assisting in the instructional program of the institution.

Staff — Employees of the institution other than faculty, postdoctorates, research assistants and teaching assistants.

Salary — "The gross salary or wages paid to personnel, excluding any fringe benefits." N.C.H.E.M.S. Cost Analysis Manual: Field Review Edition, 1974, p.202.

Scholarly Activity — "Research, scholarship, and creative work activities that are related to a specific project are recorded in this section. This category is intended for all faculty activities that involve the practice of a research-, scholarship-, or creative work-related skill. Activities that do not involve practicing that skill but that are nonetheless related to professional development are included [in this category].... The following are some examples of activities in [this category] ....

--departmental research (specific projects)
--sponsored research (specific projects)
--securing new grants
--performing your professional skill
--writing or developing research programs
--administering research grants
--giving recitals
--completing your dissertation research
--writing or revising books
--writing articles

GLOSSARY (as amended)
(continued)

Scholarly Activity, continued:

--writing reviews
--creating new art forms
--exhibiting your work
--practicing an artistic skill
--reviewing a colleague's research work

This category [also includes] ... keeping current in a professional field:

--reading articles and books related to profession
--attending professional meetings
--research-related discussion with colleagues
--editing a journal or book
--officer in a professional society."
N.C.H.E.M.S. Faculty Activity Analysis: Procedures Manual, 1973, pp. 24-26.

Supplies and Services

"A broad category of expenditures that includes all types of current fund expenditures except compensation, capital expenditures, and scholarships and fellowships.

(1) Supplies: Consumable instructional, research, and office supplies and materials.

(2) Communications: Telephone, telegraph, postal, printing, binding, and reproduction services.

(3) Travel: Transportation, food, lodging, and miscellaneous expenses reimbursed to an employee when he is representing or conducting business for the institution.

(4) Other Contractual Services: All other services produced from outside sources that can be directly identified with a particular activity center, e.g., consulting services.

(5) Noncapital Equipment: Those items of property that have an acquisition cost of less than $500 or an expected service life of less than two years."

N.C.H.E.M.S. Cost Analysis Manual: Field Review Edition, 1974, p. 203.

GLOSSARY (as amended)
(continued)

Teaching

"The scheduled teaching category is used to record all faculty activity that is directly related to courses. These courses may be degree or non-degree related, credit or non-credit, day or evening, part of the regularly assigned teaching, or overload teaching for night school. ... This category [also] includes those teaching activities that are not associated with specific courses .... For example:

--guest lecturing for another faculty member
--thesis advising
--discussions with colleagues about teaching
--thesis committee participation
--giving colloquia within the institution
N.C.H.E.M.S. Faculty Activity Analysis: Procedures Manual, 1973, pp. 16 and 21.

"Teaching" does not include the preparation of future courses or any activity carried on outside the aegis of the institution.

APPENDIX Q
QUESTIONAIRES

THE GRADCOST III STUDY

20 November 1975

Institutional Questionnaire (Q-IN)**

and

Departmental Questionnaire for Chemistry (Q-CM)

Preamble

These questionnaires are designed to assemble Institutional and Departmental Costs and other data so that preliminary cost estimations can be made for Chemistry graduate programs for the year 1973/74, as we agreed to do at our April 1975 Washington meeting.

A Glossary is included at the end of this questionnaire to define certain technical words that are used in the questionnaire. These definitions are largely paraphrases or direct quotations from the Cost Analysis Manual and the Faculty Activity Analysis: Procedures Manual of the National Center for Higher Education Management Systems, or the Audits of Colleges and Universities guide of the American Institute of Certified Public Accountants. Please refer to the Glossary when you see a term marked with an *, so we can all stay together on the meanings of our reports.

We have numbered sequentially each item of information sought in each of the questionnaires (e.g., Faculty Salaries is numbered "3" in Q-CM) so you can easily keep track of all the responses that we are asking you to make. This numbering should also help later, when we discuss the questions together. In a few cases we have already filled in a piece of information, such as identification of the institution.

Each section of this questionnaire is given a separate identification number. The following list describes the system.

Questionnaire and Section	Descriptive Title	Pages
Q-IN1	Institutional Support Costs Allocation Data--Fall Term 1973	3- 4
	These pages are reserved for information, which we will fill in at this office, from your financial reports	5- 7

** Please complete as soon as possible, and preferably by Thursday January 15, 1976, and then return one copy to:

Dr. Joseph L. McCarthy
Director, The GRADCOST III Study
238 Benson Hall --BF-10
University of Washington
Seattle, Washington 98195

Q-CM1	Departmental Expenditures--Academic Year 1973-74 and Summer Term 1974	8-9
Q-CM2	Grant and Contract Expenditures, 1973-74	10
Q-CM3	Department Course and Student Credit Hour (SCH) Data of the Chemistry Department	11-12
Q-CM4	Departmental Degree, Enrollment and Other Data	13-14
Q-CM5	Faculty Activity Analysis Data, Fall Term 1973-74 and Summer Term 1974	15
Q-CM6	Academic Year Crossover Analysis Data for Graduate Students	16
Q-CM7	Summer Term Crossover Analysis Data for Graduate Students	17-18
Q-CM8	Student Credit Hour Pattern of a "Typical" Earned Doctorate	19
Q-CM9	Student Credit Hour Pattern of a "Typical" Master's Degree	20
Q-CM10	Glossary	G1-G8

Inst.: _____ 1
Dept.: Chemistry 2

Questionnaire Q-IN I

Institutional Support Costs Allocation Data - Fall Term 1973

The information you provide in this section will be used to allocate Support Costs to the Chemistry Department graduate programs. The different types of Support Costs require different allocation procedures, so the information sought here is of several varied types. If you cannot supply some data at this time, please so note, and we will be back in touch with you.

3. Do you use "Quarter Student Credit Hours" or "Semester Student Credit Hours?" _____ 3

4. Number of Full-Time Equivalent (FTE) Faculty in the institution. _____ 4

5. Number of Freshmen and Sophomores enrolled in the institution. _____ 5

6. Number of Juniors and Seniors enrolled in the institution. _____ 6

7. Number of Graduate and Professional Students enrolled in the institution. _____ 7

8. Number of Other Students enrolled in the institution. _____ 8

9. Area in square feet of the total Assignable Area* of the institution's buildings, other than parking areas. _____ 9

10. Area in square feet of the institution's Assignable Area that is in buildings with their own custodial staff and utilities costs (i.e., space that is not maintained by Plant Operations and Maintenance expendicures.) _____ 10

11. Area in square feet of the institution's assignable area used for sponsored Research. _____ 11

12. Area in square feet of the institution's assignable area used for Grant and Contract Administration. _____ 12

13. Area in square feet of the institution's assignable area used for Instruction and for Classrooms, Class Laboratories, etc., in the total institution. _____ 13

Inst.: _____
Dept.: Chemistry

Questionnaire Q-IN I (continued)

14. Does your Financial Report category "Auxiliary Enterprises Expenditures" embrace all costs of operating the auxiliary enterprises, including charges for operation and maintenance of physical plant, general administration, and other direct and indirect costs whether charged directly as expenditures or allocated as a proportionate share of costs of other departments or units?

Yes (14) No

15. If Response Number 14 is "No": Area in square feet of the institution's Net Usable space used for Auxiliary Enterprises*.

15

16. Is Auxiliary Enterprise space a net cost to the Plant Operation and Maintenance budget?

Yes 16 No

17. Area in square feet of the institution's Net Usable space used for the Medical School's Hospital.

17

18. Is Hospital space a net cost to the Plant Operation and Maintenance budget?

Yes 18 No

Inst.: _____
Dept.: Chemistry

This part of the questionnaire is designed to assemble Support Cost data so that preliminary cost estimations can be made for Chemistry graduate programs for the year 1973/74. If data is not available for 1973/74, please use the closest available year and describe the situation in the Notes and Comments section.

Questionnaire Q-IN 2

Support Costs

What is sought here is overhead (support and maintenance) costs of the institution of which the department is a part. These overhead costs will be allocated to unit costs in order to establish a total institutional cost figure for the Chemistry graduate programs. It is assumed that all costs reported here are for a twelve-month year. If that is not the case, please describe your situation in the "Notes" section.

If you cannot supply some information at this time, please so note, and we will be back in touch with you.

		Unrestricted	Restricted
19-20.	Expenditures for Instruction and Departmental Research* during the 1973-74 year from unrestricted funds (this category includes organized activities related to Educational Departments).	19	20
21-22.	Expenditures for Sponsored Research and other Sponsored Programs during the 1973-74 year.	21	22
23-24.	Expenditures for other separately Budgeted Research* during the 1973-74 year.	23	24
25-26.	Cost of operation of the institution's General Administration* during the 1973-74 year. (This category includes General Institutional Expense that is not reported under Instruction and Departmental Research, Libraries, Student Services, Student Appointments, Plant Operation and Maintenance, Extension and Public Service, Auxiliary Enterprises and Hospital.)	25	26
27-28.	Cost of operation of the institution's Student Services* during the 1973-74 year.	27	28

Inst.: _____
Dept.: Chemistry

(Questionnaire Q-IN 2 (continued)

29-30. Cost of operation of the institution's Plant Operations and Maintenance* during the 1973-74 year.

29 _____ 30 _____

31-32. Cost of operation of the institution's Libraries* during the 1973-74 year.

31 _____ 32 _____

33-34. Cost of operation of the institution's Extension and Public Service* activities during the 1973-74 year.

33 _____ 34 _____

35-36. Cost of operation of the institution's Auxiliary Enterprises* during the 1973-74 year (not including principal and interest payments).

35 _____ 36 _____

37-38. Cost of operation of the institution's Hospital (if any) during the 1973-74 year.

37 _____ 38 _____

Notes and Comments

Inst.: _____
Dept.: Chemistry

Questionnaire Q-IN 3

Indirect Costs of Grants and Contracts

We are assuming in this section that each institution joins with the Federal government auditors in preparing an annual study of Indirect Costs, and also that the total indirect cost compensation to the institution for 1973-74 by contracting agencies is known.

Please allocate the total indirect cost compensation among the following categories according to the proportions determined in your computations of indirect cost rates applicable to Federal research agreements study of July, 1974, (e.g., if $1,000,000 was reimbursed, with reimbursement computed at 52% of salaries, and General Administration was determined to be 15% of salaries, the allocation to General Administration would be

$$\frac{15}{52} \times \$1{,}000{,}000 \text{ or } \$288{,}000$$

39.	General Administration	39
40.	Grant and Contract Administration	40
41.	Departmental Administration	41
42.	Libraries	42
43.	Operation and Maintenance of Plant	43
44.	Student Services	44
45.	Educational Benefits	45
46.	Use of Buildings	46
47.	Use of Equipment	47
48.	Other (please specify) _____	48
49.	TOTAL (Equals Total Indirect Costs Recovered By The Institution)	49

Notes and Comments

Inst.: _____
Dept.: _____

Questionnaire Q-IN 4

Supplement to Questionnaire Q-IN 2

	Unrestricted	Restricted
50-51. Student Aid	_____	_____

Inst.: _____
Dept.: Chemistry

Questionnaire Q-CM I

Departmental Expenditures - Academic Year, 1973-74 and Summer Term, 1974

What is sought here are expenditures charged against regular operating funds, unrestricted funds sometimes referred to as "hard money." The items will likely be charged to the Departmental Account Number or its equivalent.

Please note that one part of the questionnaire requests Academic Year data, and the other part of the questionnaire requests Summer Term "additional expenditures" data.

If you cannot supply some information at this time, please so note, and we will be back in touch with you.

		Academic Year 1973-74	Summer Term 1974
3-8.	Faculty Compensation*		
	Salaries*	3	4
	Fringe Benefits*	5	6
	TOTAL	7	8
9-14.	Staff Compensation*		
	Salaries	9	10
	Fringe Benefits	11	12
	TOTAL	13	14
15-20.	Hourly Wages Compensation*		
	Wages	15	16
	Fringe Benefits	17	18
	TOTAL	19	20
21-26.	Teaching Assistants*		
	Stipends	21	22
	Tuition waivers or Scholarships	23	24
	TOTAL	25	26

Inst.: _____
Dept.: Chemistry

Questionnaire Q-CM I (continued)

27-32.	Research Assistants*		
	Stipends	27	28
	Tuition Waivers or Scholarships	29	30
	TOTAL	31	32
33-38.	Postdoctorates*		
	Stipends	33	34
	Fringe Benefits	35	36
	TOTAL	37	38
39-40.	Supplies and Services*	39	40
41-42.	Equipment*	41	42
43-44.	Other	43	44
45-46.	Dollar amount of fellowships* to Graduate Students administered by the Chemistry Department exclusively (Grant and Contract Training and Fellowship expenditures).	45	46
47-48.	Dollar amount of fellowships* to Chemistry Graduate Students administered by university offices other than the Chemistry Department.	47	48

Notes and Comments

Inst.: _____
Dept.: Chemistry

Questionnaire Q-CM 3

Department Course and Student Credit Hour (SCH) Data of the Chemistry Department

With respect to courses and course enrollments, in the first part, data sought is for the Fall Semester, 1973-74, or the Autumn Quarter, 1973-74, or for the closest available period if these are not available, and in the second part data is sought for Summer Term, 1974.

Fall Semester or Autumn Quarter, 1973/74

Course Levels	Number of Courses*	Student Credit Hours Taken By Undergraduate Students	Graduate Students First Year*	Graduate Students Advanced Years*
59-62. Lower Division*	59	60	61	62
63-66. Upper Division*	63	64	65	66
67-70. First Year Graduate*	67	68	69	70
71-74. Advanced Years Graduate*	71	72	73	74
75-77. Independent Study and/or Research*		75	76	77
78-80. Thesis Research and Preparation*		78	79	80
81-83. Dissertation Research and Preparation*		81	82	83

Inst.:
Dept.: Chemistry

Questionnaire Q-CM 3 (continued)

Summer Term, 1974

Course Levels	Number of Courses*	Student Credit Hours Taken By		
		Undergraduate Students	Graduate Students	
			First Year*	Advanced Years*
84-87. Lower Division	84	85	86	87
88-91. Upper Division	88	89	90	91
92-95. First Year Graduate	92	93	94	95
96-99. Advanced Years Graduate	96	97	98	99
100-102. Independent Study and/or Research		100	101	102
103-105. Thesis Research and Preparation		103	104	105
106-108. Dissertation Research and Preparation		106	107	108

Notes and Comments

Inst.: _____
Dept.: Chemistry

Questionnaire Q-CM 4

Departmental Degree, Enrollment and Other Data

With respect to degrees awarded, full-time graduate students, etc., the data sought is for the five-year period ending with 1974/75 so that we may develop multiyear averages.

Degrees and Enrollment Data

(For each 12 month period following1 July)

		1970/71	1971/72	1972/73	1973/74	1974/75
109-113.	Number of Masters degrees awarded	109	110	111	112	113
114-118.	Number of Ph.D. degrees conferred	114	115	116	117	118

(Fall Quarter or Semester)

119-123.	Number of full-time graduate students	119	120	121	122	123
124-128.	Number of part-time graduate students	124	125	126	127	128

		1974 Winter Quarter (If on Semester basis, Leave blank)	1974 Spring Quarter or Semester	1975 Summer Term
129-131.	Number of full-time Graduate students	129	130	131
132-134.	Number of part-time graduate students	132	133	134

135. Number of Full-Time Equivalent (FTE) Faculty* in the Chemistry Department. 135

136. Area in square feet of Assignable Area used for Instruction and for Classrooms, Class Laboratories, etc., in the Chemistry Department. 136

Inst.:
Dept.: Chemistry

Questionnaire Q-CM 4 (continued)

Notes and Comments

Inst.: _____
Dept.: Chemistry

Questionnaire Q-CM 5

Faculty Activity Analysis Data

Fall Term 1973-74 and Summer Term 1974

These questions are intended to solicit information or estimates about the use of faculty time as reported in Faculty Activity Analysis surveys. If you provide information that is not based on a Faculty Activity Analysis survey, please add a description of the source of your information. If you cannot respond to one or more of the questions, please so note, and we will be back in touch with you.

		Fall Term	Summer Term
137-150.	Percentage of faculty time expended in teaching* and the duties normally associated with teaching in Autumn Term 1973/74 in:		
137-138.	Lower Division Courses*	137	138
139.140.	Upper Division Courses	139	140
141-142.	First Year Graduate Courses	141	142
143-144.	Advanced Years Graduate Courses	143	144
145-146.	Independent Study and/or Research Courseas	145	146
147-148.	Thesis Research and Preparation for Thesis Research	147	148
149-150.	Dissertation Research and Preparation for Dissertation Research	149	150
151-152.	Percentage of faculty time spent on scholarly activity*	151	152
153-154.	Percentage of faculty time spent on activities other than teaching and scholarly activity (this category includes paid faculty leave time):	153	154
	TOTAL	100%	100%

Notes and Comments

Inst.: _____
Dept.: Chemistry

Questionnaire Q-CH 6

Academic Year Crossover Analysis Data for Graduate Students

What is sought here is the actual or estimated number of student credit hours that Chemistry students take in their own and in other departments.

155. This is for 1973-74 (Autumn____, or Winter____, or Spring____) Term.

FIRST YEAR GRADUATE STUDENTS

156. Number of Chemistry major First Year graduate students who took the SCH reported below. _____ 156

157-170. How many student credit hours did Chemistry major First Year graduate students take in the following groups and levels?

GROUPS AND LEVELS	Lower Division*	Upper Division*	First Year Graduate	Advanced Years Graduate	Independent Research	Thesis	Dissertation
Chemistry Dept.	157	158	159	160	161	162	163
Other Departments	164	165	166	167	168	169	170

ADVANCED YEARS GRADUATE STUDENTS

171. Number of Chemistry Advanced Years graduate students taking the SCH reported below. _____ 171

172-185. How many student credit hours did Chemistry major Advanced Years graduate students* take in the following groups and levels?

GROUPS AND LEVELS	Lower Division*	Upper Division*	First Year Graduate	Advanced Years Graduate	Independent Research	Thesis	Dissertation
Chemistry Dept.	172	173	174	175	176	177	178
Other Departments	179	180	181	182	183	184	185

Inst.: _____
Dept.: Chemistry

Questionnaire Q-CM 7

Summer Term Crossover Analysis Data for Graduate Students

What is sought here is the actual or estimated number of student credit hours that Chemistry students take in their own and other departments.

This data is for 1974 Summer Term.

FIRST YEAR GRADUATE STUDENTS

186. Number of Chemistry First Year graduate students taking the SCH reported below ___ 186.

187-200. How many student credit hours did Chemistry major First Year graduate students take in the following groups and levels?

GROUPS AND LEVELS	Lower Division	Upper Division	First Year Graduate	Advanced Years Graduate	Independent Research	Thesis	Dissertation
Chemistry Dept.	187	188	189	190	191	192	193
Other Departments	194	195	196	197	198	199	200

ADVANCED YEARS GRADUATE STUDENTS

201. Number of Chemistry Advanced Years graduate students taking the SCH reported below ___ 201.

202-215. How many student credit hours did Chemistry major Advanced Years graduate students take in the following groups and levels?

GROUPS AND LEVELS	Lower Division	Upper Division	First Year Graduate	Advanced Years Graduate	Independent Research	Thesis	Dissertation
Chemistry Dept.	202	203	204	205	206	207	208
Other Departments	209	210	211	212	213	214	215

Inst.: _____
Dept.: Chemistry

Questionnaires Q-CM 6, Q-CM 7 (continued)

Notes and Comments

Inst.: _____
Dept.: Chemistry

Questionnaire Q-CM 8

Student Credit Hour Pattern of a "Typical" Earned Doctorate

The crossover analyses requested earlier display student credit hour (SCH) data for aggregations of students--some of whom will not complete the requirements for a doctor's degree in this department. What is requested here is the number of SCH in the Chemistry department and in other departments at each level that the "typical" person who earned a doctor's degree in this department took while in the process of earning that degree.

Except, do not include students who have completed their Master's degrees in this field at other institutions. Do include students who have earned Master's degrees at your institution en route to their Doctor's degrees. And, do include their Master's program SCH in the pattern reported below.

Is the information reported below based on

216. _____ (216) examination of degree recipients' transcripts?

217. _____ (217) estimates by the department chairman?

218. _____ (218) estimates by a Graduate School Dean?

219. _____ (219) references to the institution's catalogue or to departmental regulations?

220. _____ (220) other? (Please specify)_____

This information is about ONE person only!

Student Credit Hour Data for a "Typical" Earned Doctorate

221-232. What is sought here is the actual or estimated number of student credit hours at each level taken by a "typical" person who earns a doctor's degree in the Chemistry Department.

	Lower Division	Upper Division	Graduate Classes	Independent Research	Thesis	Dissertation
Chemistry Department	_____ (221)	_____ (222)	_____ (223)	_____ (224)	_____ (225)	_____ (226)
Other Departments	_____ (227)	_____ (228)	_____ (229)	_____ (230)	_____ (231)	_____ (232)

Inst.: _____
Dept.: Chemistry

Questionnaire Q-CM 9

Student Credit Hour Pattern of A "Typical" Master's Degree

This form requests the same type of information about a "typical" master's degree recipient as the previous form (Q-CM 8) requests about a typical doctor's degree recipient. What is requested here is the number of SCH in the Chemistry department and in other departments at each level that the "typical" person who earns a master's degree in this department takes while in the process of earning that degree.

Is the information reported below based on

233. _____ (233) examination of degree recipients' transcripts?

234. _____ (234) estimates by the department chairman?

235. _____ (235) estimates by a Graduate School Dean?

236. _____ (236) reference to the institution's catalogue or to departmental regulations?

237. _____ (237) other? (Please specify)_____

This information is about ONE person only!

Student Credit Hour Data for a "Typical" Earned Master's Degree

238-247. What is sought here is the actual or estimated number of student credit hours at each level taken by a "typical" person who earns a Master's Degree in the Chemistry Department.

	Lower Division	Upper Division	Graduate Classes	Independent Research	Thesis
Chemistry Department	_____ (238)	_____ (239)	_____ (240)	_____ (241)	_____ (242)
Other Department	_____ (243)	_____ (244)	_____ (245)	_____ (246)	_____ (247)

Inst.:_____

B

Dept.:_____

Questionnaire Q-S3

Student Appointments
For The Academic Year 19__ - __ and Summer Term 19__

The information requested here will be used to describe the expenditures associated with student appointments in the department.

	Unrestricted Funds	Restricted Funds
Teaching Assistants:		
Undergraduate student appointments	$_____	$_____
Graduate student appointments	$_____	$_____
Research Assistants:		
Undergraduate student appointments	$_____	$_____
Graduate student appointments	$_____	$_____
Fellowships:		
Administered through the Department		
Undergraduate student appointments	$_____	$_____
Graduate student appointments	$_____	$_____
Administered from Outside the Department		
Undergraduate student appointments	$_____	$_____
Graduate student appointments	$_____	$_____
Post-Doctorate appointments:	--	$_____

Tuition Waivers for Academic Year: Please describe briefly whether tuition waivers are given and, if so, with what arrangements and with what approximate total value:

Undergraduate students _____

Graduate students _____

Tuition Rates for Academic Year;

Undergraduate students

Normal (e.g., In-State) $_____

Special (e.g., Out-of-State) $_____

Graduate (M.A., M.S., Ph.D., etc.) students

Normal (e.g., In-State) $_____

Special (e.g., Out-of-State) $_____

Notes and Comments

Inst.:_____

C

Dept.:_____

Questionnaire Q-S4

Grant and Contract Expenditures

Please Note: To respond to these questions, we suggest that the Department Chairman and the budget or fiscal officer of the department jointly look over and write in their best estimates rather than try to develop precise detailed answers gleaned from departmental records.

We understand that the total amount of Grant and Contract direct expenditures in this department for 1973-74 was $_____

Is this figure approximately correct (within 5% one way or the other)?

_____ or _____
YES NO

If not, what is the correct figure? $_____

It is commonly believed that some grant and contract expenditures have some effect on universities' educational activities, even though the funding agency may not deliberately intend such effects. The following three questions try to get at that relationship.

What approximate percentage (within 5% one way or the other) of the total grant and contract direct expenditures specified above were expended for each of the following categories? (They should add up to 100%)

Question 1: For activities substantially related to, or a part of, the educational activities of the department? _____ %

Please break this percentage down by departmental academic program:

the Doctor's program _____ %

the Master's program _____ %

the Undergraduate program _____ %

Question 2: For research and associated activities that are substantially unrelated to or separate from the educational activities of the department? _____ %

Question 3: For activities other than the educational and/or research activities of the department? _____ %

Total 100 %

Questionnaire Q-S4 continued

The last two questions are concerned with how much educationally related grant and contract monies are needed in relation to certain standards of academic quality, which is another way of saying how important such grant and contract dollars are to the department.

Question 6: Assuming no change in the number or level distribution of students or of faculty in the department, nor any change in the size or quality of the department's physical facilities, nor any change in the size of the departmental budget (excluding grant and contract funds) - by what percentage could the educationally related grant and contract direct expenditures (of Question 1) be reduced without substantially reducing the quality of the department's doctoral program? (Circle the percentage, please.)

0	10	20	30	40	50	60	70	80	90	100%
no reduction possible										all could be eliminated

Question 7: Assuming there would be no change in the number of students, etc., as specified in Question 6 - and assuming that no other institution suffered any reduction of grant and contract funding - by what percentage could the educationally related grant and contract direct expenditures (of Question 1) be reduced before the decline in the quality of the doctoral program would make it advisable, in your opinion, to terminate the offering of this program? (Circle the percentage, please.)

0	10	20	30	40	50	60	70	80	90	100%
no reduction possible										all could be eliminated

Notes and Comments

Thank you very much for giving us your expert judgement on these questions.

THE GRADCOST III STUDY

Questionnaire for Cell Biology (G-37)

Preamble

The intent of this questionnaire is to obtain information for your institution about a field which is sometimes identified as "cell biology." We hope to combine the data here collected with other data you have provided to us in order to obtain cost estimates for graduate work in cell biology.

It is understood that your institution may not have a department of cell biology, or even an authorized graduate degree program entitled cell biology, but it may have individual graduate students and/or an interdisciplinary faculty and graduate student group studying the subject.

Graduate students with major interest in this field should be identifiable via the subject matter of their theses and/or dissertations. To us the following titles of Ph.D. dissertations submitted at the University of Washington during the 1974-75 year seem to be illustrative of doctoral work in cell biology:

Enzymatic Control of Histone Phosphorylation During the Cell Cycle of Physarum polycephalum (Microbiology)

Temperature-Sensitive Mutants in an Established Mouse Cell Line: Evidence for a Cell Division Cycle Mutant (Genetics)

Growth and Metabolism in Relation to Tracheid Differentiation in Cultured Tuber Tissue of Helianthus tuberosus L. (Botany)

Coordination of Cell Cycle Events in Saccharomyces cerevisiae (Genetics)

Studies on the Formation and Antimicrobial Activities of Langhans Giant Cells Resulting from Fusion of Cultured Rabbit Alveolar Macrophages Under the Influence of Lymphokines Produced In Vitro and In Vivo (Microbiology)

Function and Structure of Rainbow Trout Leukocytes (Fisheries)

Products of Murine Spleen Cells that Specifically Modulate Cell-Mediated Immunity to Syngeneic Tumor Cells (Pathology)

The Convulsant Action of Pentylenetetrazol on Molluscan Neurons (Physiology and Biophysics)

In these cases the graduate students were formally enrolled in the department named in brackets and additional cases might be found in other departments as Anatomy, Biochemistry, Zoology, etc. This questionnaire is concerned with such selected students or an interdisciplinary group active in the subject field.

Please respond to the questionnaire to the extent possible. If there are any questions, call Dr. William D. Garrison COLLECT at (206) 543-2324 or Dr. Joseph L. McCarthy's answering machine at (206) 543-6683 and we shall call you back at the earliest opportunity.

Inst.:_____

E

Questionnaire Q-S7

Cell Biology

Expanded Student Credit Hour Pattern
of a "Typical" Doctorate in Cell Biology

We are concerned here with the distribution among areas and levels of the student credit hours taken by the "typical" person who has taken a doctor's degree in or closely relating to "cell biology."

Is the information reported below based on

S7-1. _____examination of degree recipients' transcripts?

S7-2. _____estimates by a "Cell Biology Chairman"?

S7-3. _____estimates by a Graduate School Dean?

S7-4. _____references to the institution's catalog or regulations?

S7-5. _____other? (Please specify._____)

What is requested here is the approximate number of student credit hours taken in his total graduate student career in each of the specified areas at each level that the "typical" graduate student who has earned a doctor's degree relating to cell biology took while in the process of earning that degree.

Do not include students who completed their master's degrees in this field at other institutions. Do include students who earned master's degrees at your institution en route to their doctor's degrees. And, do include their master's program student credit hours in the pattern reported below.

The following information is about ONE representative person only!

Area/Level	Lower Division	Upper Division	Graduate Classes	Graduate Independent Research	Thesis	Dissertation
Humanities and Fine Arts (e.g., English)	_____ 6	_____ 7	_____ 8	_____ 9	_____ 10	_____ 11
Social Sciences (e.g., Economics)	_____ 12	_____ 13	_____ 14	_____ 15	_____ 16	_____ 17
Natural Sciences (e.g., Chemistry)	_____ 18	_____ 19	_____ 20	_____ 21	_____ 22	_____ 23
Mathematics	_____ 24	_____ 25	_____ 26	_____ 27	_____ 28	_____ 29
Medical Sciences	_____ 30	_____ 31	_____ 32	_____ 33	_____ 34	_____ 35
Other	_____ 36	_____ 37	_____ 38	_____ 39	_____ 40	_____ 41

APPENDIX A
PROCEDURES FOR CALCULATION

APPENDIX A-1

Departmental Costs by CLASSCUT Procedure

A 1.0 Outline of Procedure

In the CLASSCUT procedure (and also the CLADCUT procedure described below), the total cost of faculty compensation and benefits in a department is divided among the Bachelor's, Master's, and Doctor's programs and Service activities according to the number of classes given in the department which are designed primarily to serve the students in each of these programs, respectively.

All Lower Division classes are assigned to Lower Division Undergraduate Activity (LDUA). Upper Division and Master's level classes are assigned to Upper Division Undergraduate Activity (UDUA), the Master's program and the Doctor's program in proportion to the numbers of student credit hours taken at each of those levels by the students in the respective programs or situations. Classes at the Doctor's level are assigned to the Master's and the Dostor's programs only in proportion to the number of student credit hours taken at the subject level by the students in each of the two programs.

A special problem arises in this allocation procedure because of the existence of courses taught on an individual basis without any formal classes being held, i.e., Independent Study, Thesis and Dissertation. To put this faculty effort into course equivalent terms so that the CLASSCUT allocation procedure can be applied, a certain number of class "equivalents" is determined by calculating the average number of student credit hours associated with each graduate level class in the department, multiplying that average number by an Equivalence Factor, and then dividing the resulting equivalent student credit hours per class into the number of student credit hours generated in Independent

Study, Thesis and Dissertation activity to yield the numbers of classes corresponding to each of the three types of courses. The number of classes are distributed to the Master's and Doctor's programs depending on the number of individual study student credit hours taken by students in each of these programs.

The CLASSCUT procedure now prescribes allocation of the costs of the total faculty compensation and benefits (Category 1 costs) to the Doctor's and Master's programs and to UDUA and LDUA in proportion to the number of classes in the program.

The remaining Categories 2a, 2b, and 3 of departmental costs are Teaching Assistants' stipends, Research Assistants' and Postdoctoral Appointee stipends and benefits, staff and hourly workers' compensation, and the cost of supplies and services, equipment and other expenses.

The cost of Teaching Assistants' stipends (Category 2a) is allocated 80% to LDUA and 20% to UDUA. The costs of Research Assistants and Postdoctoral Appointees (Category 2b) are allocated between the Master's and the Doctor's programs in proportion to the number of students in each of these programs. The operations costs (Category 3), associated with staff and hourly workers, and with supplies and services, equipment, and other costs are distributed in proportion to the number of classes assigned to LDUA and UDUA and to the Master's and Doctor's programs, just as the faculty costs were distributed.

LDUA and UDUA costs, separately, are now allocated to the Bachelor's degree program and to the Service function.

To estimate the numbers of undergraduates who are actually or potentially students and will probably "major" in the subject field and thus may be considered as enrolled in the Bachelor's program, an Upper Division Population Factor (UDPF) is first calculated by dividing the total number of juniors and seniors in the college into the number of juniors and seniors in the college who have

declared their "major" in any specific field. The number of actual or potential juniors and senior "majors' in the subject field, and thus in the subject Bachelor's degree program, is taken to be the number of juniors and seniors who have declared their major in the subject field divided by the UDPF. The number of actual and prospective freshman and sophomore "majors," and thus the number of students in the subject Bachelor's program, is taken to be the same as the number of junior and senior students estimated to be enrolled in the subject Bachelor's program.

The costs of LDUA are allocated in part to the Bachelor's degree program in proportion to the number of student credit hours, estimated to have been taken in the subject department by students in the Bachelor's program, divided by the total number of SCH generated in the department's Lower Division courses. The costs of UDUA are allocated similarly.

Costs of the Service function are taken to be the difference between the estimated Bachelor's degree program costs at each level and the total LDUA and UDUA costs, respectively. Note that departmental service costs may be either positive or negative numbers, depending upon whether the subject department gives more or less service that its undergraduate majors receive from other departments.

Total twelve month departmental costs of the Bachelor's, Master's or Doctor's programs and of the Service function are determined by adding up the separate allocated costs for the Academic Year and then combining these with the Summer Term costs which are separately determined in each of the five procedures.

APPENDIX A-1

Departmental Costs by CLASSCUT Procedure

A 1.1 Total Academic Year Departmental Cost by Categories: Calculate or assemble:

A 1.1.1 gross Category 1 costs by adding Total Faculty Compensation, Total Staff Compensation and Total Hourly Wages Compensation;

A 1.1.2 Category 2a costs, which are Teaching Assistant Stipends;

A 1.1.3 total Category 2b costs by adding the Total Research Assistant Costs and Total Postdoctorates Costs which show on the regular Departmental budget, and thus do not reflect grant and contract funding;

A 1.1.4 total Category 3 costs by adding Supplies and Services costs, Equipment costs and Other costs.

A 1.2 Departmental Administration Costs for Grant and Contract Activities: Calculate the cost of departmental administration support for grant and contract activities by multiplying the institution's estimated departmental administration indirect costs by the ratio of the department's grant and contract expenditures to the total institution's grant and contract expenditures.

A 1.3 Net Category 1 Departmental Cost: Calculate the net Category 1 cost by subtracting the indirect costs of departmental administration for grants and contracts (from A 1.2) from the gross Category 1 cost (from A 1.1.1).

A 1.4 Number of Classes: Calculate or assemble:

A 1.4.1 the number of classes given at the Lower Division level, the Upper Division level and the Master's and Doctor's Classes levels, but not in Independent Study, Thesis and Dissertation courses, and then

A 1.4.2 the number of class equivalents offered as Independent Study, Thesis and Dissertation by:

A 1.4.2.1 adding the number of classes (not including Independent Study,

Thesis and Dissertation) given at the Master's Classes level to the number of classes given at the Doctor's Classes level;

A 1.4.2.2 adding the number of credit hours (not including Independent Study, Thesis and Dissertation) given at the Master's Classes level to the number of credit hours given at the Doctor's Classes level;

A 1.4.2.3 dividing the sum A 1.4.2.2 by the sum A 1.4.2.1 in order to get the average number of student credit hours per graduate level class;

A 1.4.2.4 dividing the quotient A 1.4.2.3 into the number of credit hours given to each type of student at the Independent Study level, summing the quotients and multiplying by an Equivalence Factor (taken to be equal to 1.0 for present calculation) to obtain the number of classes equivalent to the number of student credit hours given at the Independent Study level; and

A 1.4.2.5 repeating the process of A 1.4.2.4 for the Thesis and Dissertation levels.

A 1.5 Distribution of classes to levels:

A 1.5.1 Assign all the Lower Division classes to the Lower Division Undergraduate type of students;

A 1.5.2 allocate the number of classes at the Upper Division level and the Master's Classes level among the Upper Division Undergraduate, the Master's and the Doctor's types of students according to the proportions of student credit hours taken by each student type at those Upper Division and Master's Classes levels;

A 1.5.3 allocate the number of classes at the Doctor's Classes level between the Master's Student and Doctor's Student types only, according to the proportions of student credit hours taken by those two student types at the Doctor's Classes level (that is, repeat process A 1.5.2 except assign zero classes to the Undergraduate student type) and

A 1.5.4 repeat the process of A 1.5.3 for the Independent Study, Thesis and Dissertation levels.

A 1.6 Numbers of Classes Associated with Lower Division Undergraduate Activity, Upper Division Undergraduate Activity, Master's Program and Doctor's Program: Determine these numbers:

A 1.6.1 by summing the classes allocated to the Lower Division Undergraduate type of student, in order to obtain the number of Lower Division Undergraduate classes; and

A 1.6.2 by repeating the process of A 1.6.1 for the Upper Division Undergraduate, Master's and Doctor's student types.

A 1.7 Allocation of Costs to Programs: Calculate

A 1.7.1 the amount of Category 1 costs to be allocated to each program or activity by distributing the net cost of Category 1 among the programs and activities according to the proportions of classes allocated among the corresponding student types;

A 1.7.2 the distribution of Category 2a costs by assigning arbitrarily 80 per cent of the Teaching Assistant Stipend costs to the Lower Division Undergraduate Activity and 20 per cent of the Teaching Assistant Stipend costs to the Upper Division Undergraduate Activity;

A 1.7.3 the allocation of Category 2b costs between the Master's program and the Doctor's program according to the relative Autumn Term head-count numbers of the students in the two programs; and

A 1.7.4 the allocation of total Category 3 costs to each program and activity according to the proportions of classes allocated among the corresponding student types.

A 1.7.5 calculate the Lower Division Undergraduate, Upper Division Undergraduate, Master's and Doctor's programs and activities costs by combining for each program and activity the costs allocated to it in steps A 1.7.1 through A 1.7.4.

A 1.7.6 Calculate the Upper Division Population Factor (U.D.P.F.) by dividing the total number of juniors and seniors in the college into the number of juniors and seniors in the college who have declared their major in a specific field. (Neither the dividend nor the divisor is to include students who have declared that their major will be in a field outside of the college.)

A 1.7.7 Estimate the number of program juniors and seniors by dividing the number of juniors and seniors who have declared their major in the program by the U.D.P.F. (A 1.7.6).

A 1.7.8 Estimate the number of program freshmen and sophomores to be equal to the estimated number of program juniors and seniors (A 1.7.7).

A 1.7.9 Estimate the number of program freshman and sophomore student credit hours by multiplying the estimated number of program freshmen and sophomores (A 1.7.8) by fifteen, or by a best estimate of the average number of student credit hours taken per term by freshmen and sophomores.

A 1.7.10 Estimate the number of program junior and senior student credit hours by multiplying the estimated number of program juniors and seniors (A 1.7.7) by fifteen, or by a best estimate of the average number of student credit hours taken per term by juniors and seniors.

A 1.7.11 Calculate the amount of Lower Division Undergraduate Activity cost to be allocated to the Bachelor's program by

A 1.7.11.1 multiplying the Lower Division Undergraduate Activity cost (from A 1.7.5) by

A 1.7.11.2 the ratio of

A 1.7.11.2.1 the estimated number of program freshman and sophomore student credit hours (A 1.7.9) to

A 1.7.11.2.2 the number of student credit hours generated in Lower Division courses in the department during the Autumn Term.

A 1.7.12 Calculate the amount of Lower Division Undergraduate Activity cost to be allocated to Service by

A 1.7.12.1 multiplying the Lower Division Undergraduate Activity cost (from A 1.7.5) by

A 1.7.12.2 the ratio of

A 1.7.12.2.1 the number of student credit hours generated in Lower Division courses in the department during the Autumn Term minus the estimated number of program freshman and sophomore student credit hours (A 1.7.9) to

A 1.7.12.2.2 the number of student credit hours generated in Lower Division courses in the department during the Autumn Term.

(Note: This result may be either positive or negative).

A 1.7.13 Calculate the amount of Upper Division Undergraduate Activity cost to be allocated to the Bachelor's program by

A 1.7.13.1 multiplying the Upper Division Undergraduate Activity cost (from A 1.7.5) by

A 1.7.13.2 the ratio of

A 1.7.13.2.1 the estimated number of program junior and senior student credit hours (A 1.7.10) to

A 1.7.13.2.2 the number of student credit hours generated in upper division courses in the department during the Autumn Term.

A 1.7.14 Calculate the amount of Upper Division Undergraduate Activity cost to be allocated to Service by

A 1.7.14.1 multiplying the Upper Division Undergraduate Activity cost (from A 1.7.5) by

A 1.7.14.2 the ratio of

A 1.7.14.2.1 the number of student credit hours generated in Upper Division courses in the department during the Autumn Term minus the

estimated number of program junior and senior student credit hours (A 1.7.10) to A 1.7.14.2.2 the number of student credit hours generated in Upper Division courses in the department during the Autumn Term.

(Note: This result may be either positive or negative).

A 1.7.15 Calculate the Bachelor's program cost by adding the Lower Division Undergraduate Activity Bachelor's program cost (A 1.7.11) to the Upper Division Undergraduate Activity Bachelor's program cost (A 1.7.13).

A 1.7.16 Calculate the academic year graduate programs cost by adding the academic year Master's program cost (from A 1.7.5) to the academic year Doctor's program cost (from A 1.7.5).

A 1.8 Summer Term Costs: Calculate the programs' Summer Term costs by following the procedures of A 1.1 through A 1.7.6 but using Summer Term figures instead of academic year figures and taking the result of A 1.2 to be zero.

A 1.9 Partial Departmental Costs of Program

A 1.9.1 The Academic Year Lower Division partial program cost is equal to the Lower Division Undergraduate Activity Bachelor's program cost (A 1.7.11), and the Academic Year Upper Division partial program cost is equal to the Upper Division Undergraduate Activity Bachelor's program cost (A 1.7.13).

A 1.9.2 Calculate the Summer Term Lower Division partial program cost and the Summer Term Upper Division partial program cost by following the procedure of A 1.9.1 but using Summer Term costs instead of Academic Year figures.

A 1.10 Twelve-Month Departmental Costs of Program

A 1.10.1 Calculate the twelve-month year program cost for the Bachelor program by adding the Academic Year Bachelor program cost (from A 1.7.15) and the Summer Term Bachelor program cost (from A 1.8).

A 1.10.2 Calculate the twelve-month year program costs for the Master's and Doctor's programs by following the procedure of A 1.10.1 but using Master's

program and Doctor's program costs, respectively, instead of Bachelor's program costs.

A 1.10.3 Calculate the twelve-month year graduate programs cost by adding the twelve-month year Master's program cost (from A 1.10.2) to the twelve-month year Doctor's program cost (from A 1.10.2).

APPENDIX A-2

Departmental Costs by CLADCUT Procedure

A 2.0 Outline of Procedure

The CLADCUT and the just-described CLASSCUT procedures are identical except that in the former case categories 1b and 3 costs are allocated in proportion to the number of weighted student credit hours taken by students at the Lower Division and Upper Division Undergraduate and the Master's and Doctor's levels where undergraduate student credit hours are weighted 1.0 and the graduate student credit hours are weighted as 4.0.

APPENDIX A-2

Departmental Costs by CLADCUT Procedure

A 2.1 Academic Year Departmental Cost by Categories: Calculate or assemble:

A 2.1.1 total Category 1a cost, which is Total Faculty Compensation;

A 2.1.2 total Category 1b cost by adding Total Staff Compensation and Total Hourly Wages Compensation;

A 2.1.3 total Category 2a cost, which is Teaching Assistantship Stipends;

A 2.1.4 total Category 2b cost, which is Postdoctorates' Benefits and Research Assistants' stipends which show on the regular Departmental budget, and thus do not reflect grant and contract funding;

A 2.1.5 total Category 3 costs by adding Supplies and Services, Equipment and Other expenditures.

A 2.2 Departmental Administration Costs for Grant and Contract Activities: Calculate the cost of departmental administration support for grant and contract activities by

A 2.2.1 multiplying

A 2.2.1.1 the institution's estimates of the indirect costs of departmental administration for Federal Government grants and contracts by

A 2.2.1.2 the ratio of the institution's total grants and contracts expenditures to the institution's Federal Government grants and contracts expenditures and then

A 2.2.2 multiplying

A 2.2.2.1 that product (A 2.2.1) by

A 2.2.2.2 the ratio of the department's grant and contract expenditures to the institution's total grants and contracts expenditures.

A 2.3 Net Category 1a Departmental Cost: Calculate the net Category 1a cost by subtracting the indirect costs of departmental administration for grants and contracts (from A 2.2) from the gross Category 1a cost (from A 2.1.1).

A 2.4 Numbers of Classes: Calculate or assemble:

A 2.4.1 the number of classes given at the Lower Division level, the Upper Division level and the Master's and Doctor's Classes level, but not in Independent Study, Thesis and Dissertation courses, and then

A 2.4.2 the number of class equivalents offered as Independent Study, Thesis and Dissertation by:

A 2.4.2.1 adding the number of classes (not including Independent Study, Thesis and Dissertation) given at the Master's Classes level to the number of classes given at the Doctor's Classes level;

A 2.4.2.2 adding the number of credit hours (not including Independent Study, Thesis and Dissertation) given at the Master's Classes level to the number of credit hours given at the Doctor's Classes level;

A 2.4.2.3 dividing the sum A 2.4.2.2 by the sum A 2.4.2.1 in order to get the average number of student credit hours per graduate level class;

A 2.4.2.4 dividing the quotient A 2.4.2.3 into the number of credit hours given to each type of student at the Independent Study level, summing the quotients and multiplying by an Equivalence Factor (taken to be equal to 1.0 for present calculation) to obtain the number of classes equivalent to the number of student credit hours given at the Independent Study level; and

A 2.4.2.5 repeating the process of A 2.4.2.4 for the Thesis and Dissertation levels.

A 2.5 Distribution of Classes to Levels:

A 2.5.1 assign all the Lower Division classes to the Undergraduate type of students;

A 2.5.2 allocate the numbers of classes at the Upper Division level and the Master's Classes level among the Upper Division Undergraduate, the Master's and the Doctor's types of students according to the proportions of student credit hours taken by each student type at those Upper Division and Master's Classes levels;

A 2.5.3 allocate the number of classes at the Doctor's Classes level between the Master's student and Doctor's student types only, according to the proportions of student credit hours taken by those two student types at the Doctor's Classes level (that is, repeat process A 2.5.2 except assign zero classes to the Undergraduate student type); and

A 2.5.4 repeat the process of A 2.5.3 for the Independent Study, Thesis and Dissertation levels.

A 2.6 Numbers of Classes Associated with Lower Division Undergraduate Activity, Upper Division Undergraduate Activity, Master's Program and Doctor's Program: Determine these numbers

A 2.6.1 by summing the classes allocated to the Lower Division Undergraduate type of student in order to obtain the number of Lower Division Undergraduate classes; and

A 2.6.2 by repeating the process of A 2.6.1 for the Upper Division Undergraduate, Master's and Doctor's student types.

A 2.7 Allocation of Costs to Programs: Calculate:

A 2.7.1 the amount of Category 1a costs to be allocated to each program or activity by distributing the net Category 1a cost among the programs and activities according to the proportions of classes allocated among the corresponding student types;

A 2.7.2 the distribution of Category 2a costs by assigning arbitrarily 80 per cent of the Teaching Assistant Stipend costs to the Lower Division Undergraduate Activity and 20 per cent of the Teaching Assistant Stipend costs to the Upper Division Undergraduate Activity;

A 2.7.3 the allocation of Category 2b costs between the Master's program and the Doctor's program according to the relative Autumn Term head-count numbers of the students in the two programs.

A 2.7.4 Category 1b and Category 3 costs are to be allocated proportionate to weighted student credit hours as described below.

A 2.8 Departmental Student Credit Hour Partial Costs:

A 2.8.1 Determine the number of weighted student credit hours (SCH) generated in the department during the time period under consideration by multiplying undergraduate SCH by 1.0 and multiplying graduate SCH by 4.0 and summing the products.

A 2.8.2 Calculate

A 2.8.2.1 the Category 1b partial cost per unit weighted SCH by dividing the total Category 1b cost by the number of weighted SCH calculated in A 2.8.1 and

A 2.8.2.2 the Category 3 partial cost per unit weighted SCH by dividing the total Category 3 cost by the number of weighted SCH calculated in A 2.8.1.

A 2.8.3 Obtain

A 2.8.3.1 the number of SCH taken at the Lower Division level by undergraduate students,*

A 2.8.3.2 the number of SCH taken at the Upper Division level and at the graduate level by undergraduate students,*

A 2.8.3.3 the numbers of SCH taken at all course levels by Master's students,* and,

A 2.8.3.4 the numbers of SCH taken at all course levels by Doctor's students.*

A 2.9 Allocation of Category 1b and Category 3 Costs to Programs and Activities:

A 2.9.1 Calculate the Lower Division Undergraduate Activity partial costs by multiplying the number of SCH taken at the Lower Division level by undergraduate students (A 2.8.3.1) by

A 2.9.1.1 the Category 1b partial cost per unit weighted SCH to obtain the Lower Division Undergraduate Activity Category 1b partial cost, and by

A 2.9.1.2 the Category 3 partial cost per unit weighted SCH to obtain the Lower Division Undergraduate Activity Category 3 partial cost.

A 2.9.2 Calculate the Upper Division Undergraduate Activity partial costs

A 2.9.2.1 by multiplying the number of SCH taken at the Upper Division level by Undergraduate students by 1.0 and

A 2.9.2.2 multiplying the number of SCH taken at the graduate level by Undergraduate students by 4.0, then

A 2.9.2.3 adding the products A 2.9.2.1 and A 2.9.2.2 together, and

A 2.9.2.4 multiplying the sum A 2.9.2.3 by the Category 1b partial cost per unit weighted SCH to obtain the Upper Division Undergraduate Activity Category 1b partial cost, and

A 2.9.2.5 multiplying the sum A 2.9.2.3 by the Category 3 partial cost per unit weighted SCH to obtain the Upper Division Undergraduate Activity Category 3 partial cost.

A 2.9.3 Calculate the Master's and Doctor's programs partial costs by following the procedures of A 2.9.1 through A 2.9.2.5 but using the Master's

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*Note: These students are not just the students in this department's program, but also students at the appropriate level from other departments, who are taking courses in this department.

and Doctor's students SCH figures instead of the undergraduate students' figures and including Lower Division SCH with the Upper Division SCH.

A 2.10 Academic Year Activity and Graduate Program Costs:

A 2.10.1 Calculate the Academic Year Lower Division Undergraduate activity cost by adding together the Category 1a, 1b, 2a, 2b, and 3 costs allocated to the Lower Division Undergraduate activity.

A 2.10.2 Calculate the Academic Year Upper Division Undergraduate activity, Master's program and Doctor's program costs by following the procedure of A 2.10.1 but using Upper Division Undergraduate activity, Master's program and Doctor's program cost allocations instead of the Lower Division Undergraduate activity figures.

A 2.10.3 Calculate the Academic Year Graduate program cost by adding the Academic Year Master's program cost (from A 2.10.2) to the Academic Year Doctor's program cost (from A 2.10.2).

A 2.11 Academic Year Bachelor's Program Cost:

A 2.11.1 Calculate the Upper Division Population Factor (U.D.P.F.) by dividing the total number of Autumn Term juniors and seniors in the college into the number of Autumn Term juniors and seniors in the college who have declared their major in a specific field. (Neither the dividend nor the divisor is to include students who have declared that their major will be in a field outside of the college.)

A 2.11.2 Estimate the number of program juniors and seniors by dividing the number of juniors and seniors who have declared their major in the program by the U.D.P.F. (A 2.11.1).

A 2.11.3 Estimate the number of program freshmen and sophomores to be equal to the estimated number of program juniors and seniors (A 2.11.2).

A 2.11.4 Estimate the number of program freshman and sophomore student credit hours by multiplying the estimated number of program freshmen and sophomores (A 2.11.3) by fifteen, or by a best estimate of the average number of student credit hours taken per term by freshmen and sophomores.

A 2.11.5 Estimate the number of program junior and senior student credit hours by multiplying the estimated number of program juniors and seniors (A 2.11.2) by fifteen, or by a best estimate of the average number of student credit hours taken per term by juniors and seniors.

A 2.11.6 Calculate the amount of Lower Division Undergraduate Activity cost to be allocated to the Bachelor's program by

A 2.11.6.1 multiplying the Lower Division Undergraduate Activity cost (from A 2.10.1) by

A 2.11.6.2 the ratio of

A 2.11.6.2.1 the estimated number of program freshman and sophomore student credit hours (A 2.11.4) to

A 2.11.6.2.2 the number of student credit hours generated in Lower Division courses in the department during the Autumn Term.

A 2.11.7 Calculate the amount of Lower Division Undergraduate Activity cost to be allocated to Service by

A 2.11.7.1 multiplying the Lower Division Undergraduate Activity cost (from A 2.10.1) by

A 2.11.7.2 the ratio of

A 2.11.7.2.1 the number of student credit hours generated in Lower Division courses in the department during the Autumn Term minus the estimated number of program freshman and sophomore student credit hours (A 2.11.4) to

A 2.11.7.2.2 the number of student credit hours generated in

Lower Division courses in the department during the Autumn Term.

(Note: This result may be either positive or negative).

A 2.11.8 Calculate the amount of Upper Division Undergraduate Activity cost to be allocated to the Bachelor's program by

A 2.11.8.1 multiplying the Upper Division Undergraduate Activity cost (from A 2.10.2) by

A 2.11.8.2 the ratio of

A 2.11.8.2.1 the estimated number of program junior and senior student credit hours (A 2.11.5) to

A 2.11.8.2.2 the number of student credit hours generated in Upper Division courses in the department during the Autumn Term.

A 2.11.9 Calculate the amount of Upper Division Undergraduate Activity cost to be allocated to Service by

A 2.11.9.1 multiplying the Upper Division Undergraduate Activity cost (from A 2.10.2) by

A 2.11.9.2 the ratio of

A 2.11.9.2.1 the number of student credit hours generated in Upper Division courses in the department during the Autumn Term minus the estimated number of program junior and senior student credit hours (A 2.11.5) to

A 2.11.9.2.2 the number of student credit hours generated in Upper Division courses in the department during the Autumn Term.

(Note: This result may be either positive or negative).

A 2.11.10 Calculate the Bachelor's program cost by adding the Lower Division Undergraduate Activity Bachelor's program cost (A 2.11.6) to the Upper Division Undergraduate Activity Bachelor's program cost (A 2.11.8).

A 2.12 Summer Term Costs: Calculate the programs' Summer Term costs by following the procedures of A 2.1 through A 2.11.10 but using Summer Term figures instead of academic year figures (except for calculating the U.D.P.F.) and taking the result of A 2.2 to be zero.

A 2.13 Partial Departmental Costs of Program

A 2.13.1 The Academic Year Lower Division partial program cost is equal to the Lower Division Undergraduate Activity Bachelor's program cost (A 2.11.6), and the Academic Year Upper Division partial program cost is equal to the Upper Division Undergraduate Activity Bachelor's program cost (A 2.11.8).

A 2.13.2 Calculate the Summer Term Lower Division partial program cost and the Summer Term Upper Division partial program cost by following the procedure of A 2.13.1 but using Summer Term costs instead of Academic Year figures.

A 2.14 Twelve-Month Departmental Costs of Program

A 2.14.1 Calculate the twelve-month year program cost for the Bachelor's program by adding the Academic Year Bachelor's program cost (from A 2.11.10) and the Summer Term Bachelor program cost (from A 2.12).

A 2.14.2 Calculate the twelve-month year program costs for the Master's and Doctor's programs by following the procedure of A 2.14.1 but using Master's program and Doctor's program costs, respectively, instead of Bachelor's program costs.

A 2.14.3 Calculate the twelve-month year graduate program cost by adding the twelve-month year Master's program cost (from A 2.14.2) to the twelve-month year Doctor's program cost (from A 2.14.2).

APPENDIX A-3

Departmental Costs by CREDCUT Procedure

A 3.0 Outline of Procedure

The CREDCUT procedure is based upon student credit hour cost estimates and the use of crossover analyses to obtain program cost estimates, but unlike the FAACUT or COMPCUT procedures CREDCUT does not involve a faculty activity analysis, nor does CREDCUT require the segregation of departmental costs into faculty costs, staff costs, etc.

In the CREDCUT procedure the total departmental cost figure is divided by the total number of student credit hours generated in the department to obtain an average cost per student credit hour figure. That average cost figure is multiplied by the total number of student credit hours taken by the students in each program to estimate the total departmental cost of each program.

Estimations of the number of students actually or presumed to be potentially enrolled in the Bachelor's program are carried by procedures similar to those described for CLASSCUT in Appendix A 1.0.

APPENDIX A-3

Departmental Costs by CREDCUT Procedure

A 3.1 Academic Year Departmental Gross Cost: Calculate the academic year gross departmental cost by adding Faculty, Staff and Hourly Wage compensation, Teaching Assistantship Stipends, Research Assistants' Stipends, Postdoctorates' compensation, and Supplies and Services, Equipment and Other departmental costs.

A 3.2 Departmental Administration Costs for Grant and Contract Activities: Calculate the cost of departmental administration support for grant and contract activities by:

A 3.2.1 multiplying

A 3.2.1.1 the institution's estimates of the indirect costs of departmental administration for Federal Government grants and contracts by

A 3.2.1.2 the ratio of the institution's total grant and contracts expenditures to the institution's Federal Government grants and contracts expenditures and then

A 3.2.2 multiplying

A 3.2.2.1 that product (A 3.2.1) by

A 3.2.2.2 the ratio of the department's grant and contract expenditures to the institution's total grant and contracts expenditures.

A 3.3 Net Departmental Cost: Calculate the net departmental cost by subtracting the indirect cost of departmental administration for grants and contracts (from A 3.1.2) from the gross departmental cost (from A 3.1.1).

A 3.4 Departmental Student Credit Hours: Determine the number of student credit hours (SCH) generated in the department during the academic year.

A 3.5 Departmental Student Credit Hour Cost: Calculate the cost per SCH by dividing the net departmental cost A 3.3 by the total number of SCH A 3.4.

A 3.6 Student Credit Hours by Student Level: Obtain the number of SCH taken during the academic year by

A 3.6.1 the Bachelor's program Lower Division students,

A 3.6.2 the Bachelor's program Upper Division students,

A 3.6.3 the Master's program's students, and

A 3.6.4 the Doctor's program's students.

A 3.7 Departmental Costs of Programs:

A 3.7.1 Calculate the Upper Division Population Factor (U.D.P.F.) by dividing the total number of Autumn Term juniors and seniors in the college into the number of Autumn Term juniors and seniors in the college who have declared their major in a specific field. (Neither the dividend nor the divisor is to include students who have declared that their major will be in a field outside of the college.)

A 3.7.2 Estimate the number of program juniors and seniors by dividing the number of juniors and seniors who have declared their major in the program by the U.D.P.F. (A 3.7.1).

A 3.7.3 Estimate the number of program freshmen and sophomores to be equal to the estimated number of program juniors and seniors (A 3.7.2).

A 3.7.4 Calculate the Lower Division Undergraduate partial program cost

A 3.7.4.1 by multiplying the cost per SCH (from A 3.5) by the number of SCH taken by Lower Division students during the academic year (from A 3.6.1), in order to obtain the "raw" sub-program cost, and

A 3.7.4.2 by multiplying the raw sub-program cost by the ratio of the estimated number of freshmen and sophomores (from A 3.7.3) to the number of "declared" freshmen and sophomores.

A 3.7.5 Calculate the Upper Division partial program cost by following the procedure of A 3.7.4 but using the Upper Division figures of A 3.6.2 instead of the Lower Division figures.

A 3.7.6 Calculate the Master's program departmental level cost and the Doctor's program departmental level cost by following the procedure of A 3.7.4.1 but using the Master's program and Doctor's program figures of A 3.6.3 and A 3.6.4 respectively instead of the Lower Division figures.

A 3.7.7 Calculate the Bachelor's program cost by adding the Lower Division Undergraduate partial program cost (A 3.7.4) to the Upper Division Undergraduate partial program cost (A 3.7.5).

A 3.7.8 Calculate the combined graduate program's cost by adding the academic year Master's program cost (A 3.7.6) to the academic year Doctor's program cost (A 3.7.6).

A 3.8 Summer Term Costs: Calculate Summer Term Bachelor's, Master's, and Doctor's programs' costs by the process described in A 3.1 through A 3.7 for the academic year costs, but using Summer Term data (except for calculating the U.D.P.F.) and taking the result of A 3.2 to be zero.

A 3.9 Twelve-Month Year Program Costs:

A 3.9.1 Add the Academic Year and the Summer Term Bachelor's program costs to obtain the twelve-month year Bachelor's program costs.

A 3.9.2 Calculate the twelve-month year program costs for the Master's and Doctor's program by following the procedure of A 3.9.1 but using Master's program and Doctor's program costs respectively instead of the Bachelor program costs.

A 3.9.3 Add the Twelve-Month Master's program cost and the Twelve-Month Doctor's program cost to obtain the Twelve-Month combined Graduate Programs' cost.

APPENDIX A-4

Departmental Costs by FAACUT Procedure

A 4.0 Outline of Procedure

The FAACUT (and also the COMPCUT procedure to be described below) use faculty activity analyses and the number of student credit hours taken by students in the programs as the basic information for allocation. Most faculty costs are allocated to instructional levels according to the percentages of time specified by the faculty in a faculty activity analysis, and then are reallocated to programs according to a student credit hour crossover analysis.

All costs of a department other than Teaching Assistant costs are assembled into one figure and then allocated to the different instructional levels (Lower Division, Upper Division, Master's Classes level, Doctor's Classes level, Independent Study, Thesis and Dissertation) in proportion to the fractions of faculty teaching time devoted by the faculty to the levels. The Teaching Assistant costs are allocated to the levels according to the proportions specified in a Teaching Assistant activity analysis or according to the fixed representative values of 80 per cent for Lower Division courses and 20 per cent for the Upper Division courses.

In the FAACUT procedure, once the departmental costs at the different instructional levels have been determined, the cost of one student credit hour at each level is determined by dividing the total cost at the level by the number of student credit hours generated at the level. The departmental cost of the Master's program can be estimated by multiplying the number of student credit hours taken by students in the program at each of the levels by the cost per student credit hour at each of the levels and summing the products. The other programs' costs can also be estimated analogously.

Several different estimates are possible at this point. The first is an estimate using only the cost figures for the department under consideration. Since students in the program may be taking course outside of the department,

the department's cost figures per student credit hour are used as proxies for the costs of the departments where the student credit hours are actually taken. This procedure has been used to produce the table A-4.7.

However, if more information were available, the second estimate that might be calculated at this point might use cost figures not only from the department under consideration, but also figures from selected other departments. Thus, English department figures might be obtained and used as proxies for the costs of all the departments in the Humanities and Arts fields; Chemistry department figures would be calculated and used as proxies for the costs of the Natural Science departments, etc. This is the estimate that has been used elsewhere in this study.

The third possible estimate can be calculated if all the departments that appear on the crossover analysis have been analyzed so that no proxies need be used for estimates of costs per student credit hour. This estimation procedure clearly provides the best estimates of program costs, but its application is restricted to situations in which a cost analysis of all of an institution's programs is being performed, or at least, in which the segment of the institution being analyzed does not interact significantly with other segments of the institution.

Estimations of the number of students actually or presumed to be potentially enrolled in the Bachelor's program, and also the number of student credit hours to be assigned to these students, are carried out by procedures similar to those described for CLASSCUT in Appendix A 1.0.

APPENDIX A-4

Department Costs by FAACUT Procedure

A 4.1 Academic Year Departmental Gross Cost: Calculate the academic year gross departmental cost (other than Teaching Assistantship costs) by adding Faculty, Staff and Hourly Wage compensation, Research Assistants' stipends, Postdoctorates' compensation, and Supplies and Services, Equipment and Other departmental costs.

A 4.2 Departmental Administration Costs for Grant and Contract Activities: Calculate the cost of departmental administration support for grant and contract activities by:

A 4.2.1 multiplying

A 4.2.1.1 the institution's estimates of the indirect costs of departmental administration for Federal Government grants and contracts by

A 4.2.1.2 the ratio of the institution's total grants and contracts expenditures to the institution's Federal Government grants and contracts expenditures and then

A 4.2.2 multiplying

A 4.2.2.1 that product (A 4.2.1) by

A 4.2.2.2 the ratio of the department's grant and contract expenditures to the institution's total grants and contracts expenditures.

A 4.3 Net Departmental Instruction Costs: Calculate the net departmental faculty and support costs, other than Teaching Assistantship costs, by subtracting the indirect costs for grants and contracts of departmental administration (from A 4.2 above) from gross faculty and departmental support costs (from A 4.1 above).

A 4.4 Faculty Instruction Time Distribution: Determine the total percentage of faculty time devoted to formal instruction by accumulating the percentages reported on the Faculty Activity Analysis (F.A.A.) for each specific level of teaching.

A 4.5 Allocation of Costs to Levels: Calculate the amount of departmental costs attributable to each level

A 4.5.1 by multiplying the net departmental cost figure (from A 4.3 above) by the ratio--at each level of instruction--of the percentage of faculty time devoted to instruction at that level (from the F.A.A.) to the total percentage of faculty time devoted to teaching (from A 4.4 above),

A 4.5.2 by allocating Teaching Assistantship stipends on the basis of 80% to the lower division level of instruction and 20% to the upper division level of instruction (or on the basis of the best available estimates), and

A 4.5.3 by adding the net departmental cost at each level (A 4.5.1) to the corresponding Teaching Assistantship cost at each level (A 4.5.2).

A 4.6 Generation and Costing of Departmental SCH: Determine

A 4.6.1 the student credit hours (SCH) generated in the department at each level of instruction during the period covered by the cost data, and then

A 4.6.2 the cost per SCH at each level by dividing the departmental cost at each level (from A 4.5 above) by the number of SCH at that level (from A 4.6.1 above).

A 4.7 SCH and Cost per SCH Tables: Create

A 4.7.1 a table presenting the cost per Autumn Term student credit hour at each instructional level for each department or area of instruction,

A 4.7.2 a table presenting the number of student credit hours taken during the Autumn Term at each instructional level of each department or area of instruction by Lower Division students in the department's Bachelor's program, and

A 4.7.3 a similar table for Upper Division students in the Department's Bachelor's program,

A 4.7.4 a similar table for students in the department's Master's program, and

A 4.7.5 a similar table for students in the department's Doctor's program.

A 4.8 Departmental Costs of Programs:

A 4.8.1 Calculate the Upper Division Population Factor (U.D.P.F.) by dividing the total number of Autumn Term juniors and seniors in the college into the number of Autumn Term juniors and seniors in the college who have declared their major in a specific field. (Neither the dividend nor the divisor is to include students who have declared that their major will be in a field outside of the college).

A 4.8.2 Estimate the number of program juniors and seniors by dividing the number of juniors and seniors who have declared their major in the program by the U.D.P.F. (A 4.8.1).

A 4.8.3 Estimate the number of program freshmen and sophomores to be equal to the estimated number of program juniors and seniors (A 4.8.2).

A 4.8.4 Calculate the Lower Division Undergraduate partial program cost

A 4.8.4.1 by multiplying each element of the student credit hour cost table (A 4.7.1) by the corresponding element of the Lower Division crossover analysis table (A 4.7.2),

A 4.8.4.2 by summing the products,

A 4.8.4.3 by multiplying that sum by the number of terms in the academic year, in order to obtain the "raw" sub-program cost, and

A 4.8.4.4 by multiplying the raw sub-program cost by the ratio of the estimated number of freshmen and sophomores (from A 4.8.3) to the number of "declared" freshmen and sophomores.

A 4.8.5 Calculate the Upper Division partial program cost, the Master's program departmental level cost and the Doctor's program departmental level cost by following the procedure of A 4.8.4 but using the Upper Division, Master's program and Doctor's program figures of A 4.7.3, A 4.7.4, and A 4.7.5, respectively,

instead of the Lower Division figures and omitting step A 4.8.4.4 in the Master's and Doctor's programs' calculations.

A 4.8.6 Calculate the Bachelor's program cost by adding the Lower Division Undergraduate partial program cost (A 4.8.4) to the Upper Division Undergraduate partial program cost (A 4.8.5).

A 4.8.7 Calculate the Academic Year Graduate program cost by adding the Academic Year Master's program cost (from A 4.8.5) to the Academic Year Doctor's Program cost (from A 4.8.5).

A 4.9 Summer Term Departmental Costs: Calculate Summer Term Bachelor's, Master's and Doctor's programs' costs by the procedures described in A 4.1 through A 4.8 for the Academic Year, but using Summer Term figures instead of Academic Year figures (except for calculating the U.D.P.F.) and taking the result of A 4.2 to be zero.

A 4.10 Twelve-Month Departmental Costs of Programs:

A 4.10.1 Add the Academic Year and the Summer Term Bachelor's program costs to obtain the twelve-month year Bachelor's program costs.

A 4.10.2 Calculate the twelve-month year Master's and Doctor's programs' costs by following the procedure of A 4.10.1 but using the Master's program and Doctor's program cost figures respectively instead of Bachelor's program cost figures.

A 4.10.3 Add the Twelve-Month Master's program cost and the Twelve-Month Doctor's program cost to obtain the Twelve-Month combined Graduate Programs' cost.

APPENDIX A-5

Departmental Costs by COMPCUT Procedure

A 5.0 Outline of Procedure

The COMPCUT procedure uses faculty activity analysis information but divides total faculty costs into three categories: faculty Teaching Costs, faculty Scholarly Activity Costs, and faculty Other Costs. Each of the three costs is allocated to the instructional levels separately.

The faculty teaching cost is calculated by multiplying the total faculty cost by the fraction of time spent by the faculty in specific teaching activities; it is allocated to the instructional levels proportionate to the teaching time devoted to each level of instruction.

The faculty scholarly activity cost is calculated by multiplying the total faculty cost by the fraction of time spent by the faculty in scholarly activity other than teaching; it is allocated to the instructional levels proportionate to the weighted student credit hours generated in the department at those levels. The weights applied to the student credit hours can be carried according to the best judgment of the cost analyst, but the figures used in this study are one for Lower Division student credit hours (SCH), three for Upper Division SCH, five for Master's Classes SCH, Doctor's Classes SCH, and Independent Study SCH, seven for Thesis SCH and ten for Dissertation SCH.

The faculty Other Cost is calculated by multiplying the total faculty cost by the fraction of time spent in activity other than teaching and scholarly activity (such as administration). It is allocated to the instructional levels proportionate to the unweighted student credit hours generated at those levels.

Departmental support costs such as staff salaries and supplies and services costs are added together separate from the faculty costs and are allocated to the instructional levels proportionate to the student credit hours generated at those levels, just as the faculty scholarly activity cost is distributed.

Estimations of the number of students actually or presumed to be potentially enrolled in the Bachelor's program, and also the number of student credit hours to be assigned to these students, are carried out by procedures similar to those described for CLASSCUT in Appendix A 1.0.

APPENDIX A-5

Departmental Costs by COMPCUT Procedures

A 5.1 Academic Year Departmental Cost by Categories: Calculate or assemble:

A 5.1.1 total Category 1a cost, which is Total Faculty Compensation;

A 5.1.2 total Category 1b cost by adding Total Staff Compensation and Total Hourly Wages Compensation;

A 5.1.3 total Category 2a cost, which is Teaching Assistantship Stipends;

A 5.1.4 total Category 2b cost, by adding Postdoctorates' Benefits and Research Assistants' stipends which show on the regular Departmental budget, and thus do not reflect grant and contract funding;

A 5.1.5 total Category 3 costs by adding Supplies and Services, Equipment and Other expenditures.

A 5.2 Departmental Cost per Month by Categories:

A 5.2.1 calculate Category 1a cost per month by dividing the academic year cost (A 5.1.1) by nine.

A 5.2.2 calculate the cost per month of Category 1b cost, of Category 2a cost, of Category 2b cost, and of Category 3 cost by following the procedure of A 5.2.1 but using the cost figures from A 5.1.2, A 5.1.3, A 5.1.4 and A 5.1.5 respectively.

A 5.3 Departmental Administration Costs for Grant and Contract Activities: Calculate the cost of departmental administration support for grant and contract activities by

A 5.3.1 multiplying

A 5.3.1.1 the institution's estimates of the indirect costs of departmental administration for Federal Government grants and contracts by

A 5.3.1.2 the ratio of the institution's total grants and contracts expenditures to the institution's Federal Government grants and contracts expenditures and then

A 5.3.2 multiplying

A 5.3.2.1 that product (A 5.3.1) by

A 5.3.2.2 the ratio of the department's grant and contract expenditures to the institution's total grants and contracts expenditures.

A 5.3.3 Calculate the cost per month of departmental administration support for grant and contract activities by dividing the annual amount by nine.

A 5.4 Allocation of Faculty Teaching Costs:

A 5.4.1 Determine the total percentage of faculty time devoted to direct teaching activity by accumulating the percentages reported on the Faculty Activity Analysis (F.A.A.) for each specific level of teaching.

A 5.4.2 Determine the amount of Faculty Compensation per month to be allocated to Faculty Teaching Activity by multiplying the Category la cost per month figures by the fraction of faculty time devoted to direct teaching activity at all levels of instruction (from A 5.4.1) and call this amount the Category laT cost per month.

A 5.4.3 Calculate the amount of Category laT cost per month allocable to each level by multiplying the Category laT cost per month figure (from A 5.4.2) by the ratio--at each level of instruction--of the percentage of faculty time devoted to instruction at that level (from the F.A.A.) to the total percentage of faculty time devoted to teaching (from A 5.4.1).

A 5.5 Student Credit Hours by Level: Assemble the numbers of student credit hours (SCH) taught by departmental faculty at the instructional levels considered in A 5.4.

A 5.6 Allocation of Faculty Scholarly Activity Costs:

A 5.6.1 Determine the amount of Faculty Compensation per month to be allocated to Scholarly Activity by multiplying Category la cost per month by the

fraction of faculty time devoted to Scholarly Activity and call this amount the Category 1aS cost per month.

A 5.6.2 Distribute the Category 1aS cost per month (A 5.6.1) to the instructional levels proportionate to the weighted student credit hours taught at those levels, with Lower Division SCH being weighted one, Upper Division SCH being weighted three, Master's classes, Doctor's classes and Independent Study SCH being weighted five, thesis SCH being weighted seven and Dissertation SCH being weighted ten.

A 5.7 Allocation of "Other" Faculty Time:

A 5.7.1 Determine the amount of Faculty Compensation per month to be allocated to Faculty Other Activity by multiplying the Category 1a cost per month figure by the fraction of faculty time devoted to Other Activity.

A 5.7.2 Calculate the net cost per month by subtracting the cost per month of departmental administration support for grant and contract activities (A 5.3.3) from the gross cost A 5.7.1; call this net cost the Category 1aO cost per month.

A 5.7.3 Distribute the Category 1aO cost per month (A 5.7.2) to the instructional levels proportionate to the student credit hours taken at those levels.

A 5.8 Academic Year Teaching Assistant Costs: Allocate Teaching Assistants' costs per month (Category 2a costs per month) on the basis of 80% to lower division instruction and 20% to upper division instruction (or proportionate to the best estimate of the Teaching Assistants' time distribution).

A 5.9 Allocational Category 1b, 2b and 3 Costs per Month:

A 5.9.1 Allocate the Category 1b cost per month (A 5.1.2) to the instructional levels proportionate to the weighted student credit hours taken at those levels, with Lower Division SCH being weighted one, Upper Division SCH being

fraction of faculty time devoted to Scholarly Activity and call this amount the Category 1aS cost per month.

A 5.6.2 Distribute the Category 1aS cost per month (A 5.6.1) to the instructional levels proportionate to the weighted Autumn Term student credit hours taught at those levels, with Lower Division SCH being weighted one, Upper Division SCH being weighted three, Master's classes, Doctor's classes and Independent Study SCH being weighted five, thesis SCH being weighted seven and Dissertation SCH being weighted ten.

A 5.7 Allocation of "Other" Faculty Time:

A 5.7.1 Determine the amount of Faculty Compensation per month to be allocated to Faculty Other Activity by multiplying the Category 1a cost per month figure by the fraction of faculty time devoted to Other Activity.

A 5.7.2 Calculate the net cost per month by subtracting the cost per month of departmental administration support for grant and contract activities (A 5.3.3) from the gross cost A 5.7.1; call this net cost the Category 1aO cost per month.

A 5.7.3 Distribute the Category 1aO cost per month (A 5.7.2) to the instructional levels proportionate to the Autumn Term student credit hours taken at those levels.

A 5.8 Academic Year Teaching Assistant Costs: Allocate Teaching Assistants' costs per month (Category 2a costs per month) on the basis of 80% to lower division instruction and 20% to upper division instruction (or proportionate to the best estimate of the Teaching Assistants' time distribution).

A 5.9 Allocational Category 1b, 2b and 3 Costs Per Month:

A 5.9.1 Allocate the Category 1b cost per month (A 5.1.2) to the instructional levels proportionate to the weighted Autumn Term student credit hours taken at those levels, with Lower Division SCH being weighted one, Upper Division SCH being

weighted three, Master's classes, Doctor's classes and Independent Study SCH being weighted five, thesis SCH being weighted seven and Dissertation SCH being weighted ten.

A 5.9.2 Allocate Category 2b and Category 3 costs per month to the instructional levels by following the procedure of A 5.9.1 but using the cost figures from A 5.1.4 and A 5.1.5 respectively, instead of the Category 1b cost figure.

5.10 Instructional Levels' Departmental Costs: Determine the Departmental Cost per Month at each instructional level by adding the cost per month allocated to each level from Categories 1aT, 1aS, 1aO, 1b, 2a, 2b and 3 (from A 5.4.3, A 5.6.2, A 5.7.3, A 5.9.1, A 5.8, and A 5.9.2 above).

A 5.11 Academic Year Departmental Cost per SCH: Determine the departmental cost per student credit hour at each instructional level by

A 5.11.1 dividing the Departmental Cost per Month at each level (from A 5.8) by the number of student credit hours taken during the Autumn Term at each level, and then

A 5.11.2 multiplying the quotients (A 5.9.1) by the number of months in the term during which the student credit hours were taken.

A 5.12 SCH and Cost per SCH tables: Create

A 5.12.1 a table presenting the cost per Autumn Term student credit hour at each instructional level for each department or area of instruction,

A 5.12.2 a table presenting the number of student credit hours taken during the Autumn Term at each instructional level of each department or area of instruction by Lower Division students in the department's Bachelor's program, and

A 5.12.3 a similar table for Upper Division students in the department's Bachelor's program,

A 5.12.4 a similar table for students in the department's Master's program, and

A 5.12.5 a similar table for students in the department's Doctor's program.

A 5.13 Departmental Costs of Programs:

A 5.13.1 Calculate the Upper Division Population Factor (U.D.P.F.) by dividing the total number of Autumn Term juniors and seniors in the college into the number of Autumn Term juniors and seniors in the college who have declared their major in a specific field. (Neither the dividend nor the divisor is to include students who have declared their major will be in a field outside of the college).

A 5.13.2 Estimate the number of program juniors and seniors by dividing the number of juniors and seniors who have declared their major in the program by the U.D.P.F. (A 5.13.1).

A 5.13.3 Estimate the number of program freshmen and sophomores to be equal to the estimated number of program juniors and seniors (A 5.13.2).

A 5.13.4 Calculate the Lower Division Undergraduate partial program cost

A 5.13.4.1 by multiplying each element of the student credit hour cost table (A 5.12.1) by the corresponding element of the Lower Division crossover analysis table (A 5.12.2),

A 5.13.4.2 by summing the products,

A 5.13.4.3 by multiplying that sum by the number of terms in the academic year, in order to obtain the "raw" sub-program cost, and

A 5.13.4.4 by multiplying the raw sub-program cost by the ratio of the estimated number of freshmen and sophomores (from A 5.13.3) to the number of "declared" freshmen and sophomores.

A 5.13.5 Calculate the Upper Division partial program cost, the Master's program departmental level cost and the Doctor's program departmental level cost by following the procedure of A 5.13.4 but using the Upper Division, Master's program departmental level cost and the Doctor's program departmental level cost by following the procedure of A 5.13.4 but using the Upper Division, Master's program and Doctor's program figures of A 5.12.3, A 5.12.4, and A 5.12.5, respectively, instead of the Lower Division figures, and omitting step A 5.13.4.4 in the Master's and Doctor's programs' calculations.

A 5.13.6 Calculate the Bachelor's program cost by adding the Lower Division Undergraduate partial program cost (A 5.13.4) to the Upper Division Undergraduate partial program cost (A 5.13.5).

A 5.13.7 Calculate the Academic Year Graduate program cost by adding the Academic Year Master's program cost (from A 5.13.5) to the Academic Year Doctor's program cost (from A 5.13.5).

A 5.14 Summer Term Departmental Costs: Calculate Summer Term Bachelor's, Master's and Doctor's programs' costs by the procedure described in A 5.1 through A 5.13 for the Academic Year, but using Summer Term figures instead of Academic Year figures (except for calculating the U.D.P.F.), substituting "three" for "nine" in A 5.2.1, and taking the result of A 5.2 to be zero.

A 5.15 Twelve-Month Departmental Costs of Programs:

A 5.15.1 Add the Academic Year and the Summer Term Bachelor's program costs to obtain the twelve-month year Bachelor's program costs.

A 5.15.2 Calculate the twelve-month year Master's and Doctor's programs' costs by following the procedure of A 5.15.1 but using the Master's program and Doctor's program cost figures respectively instead of Bachelor's program cost figures.

A 5.15.3 Add the Twelve-Month Master's program cost and the Twelve-Month Doctor's program cost to obtain the Twelve-Month combined Graduate Programs' cost.

APPENDIX A-6
Unit Degree Costs by the PROFAACUT and PROCOMPCUT Procedures

A 6.1 Determine the FAACUT based cost per Bachelor's degree (the PROFAACUT Bachelor's degree cost)

A 6.1.1 by determining the cost per student credit hour (SCH) as calculated with the FAACUT procedure at the Lower Division, Upper Division, Master's Classes and Independent Research levels,

A 6.1.2 by determining the average number of SCH taken at each of those levels by Bachelor's degree recipients during their Bachelor's program studies,

A 6.1.3 by multiplying the cost per SCH at each level (from A 6.1.1) by the number of SCH at that same level (from A 6.1.2), and

A 6.1.4 then by adding the four products calculated in A 6.1.3.

A 6.2 Determine the FAACUT based cost per Master's degree (the PROFAACUT Master's degree cost)

A 6.2.1 by determining the cost per SCH as calculated with the FAACUT procedure at the Lower Division, Upper Division, Master's Classes, Independent Research and Thesis levels,

A 6.2.2 by determining the average number of SCH taken at each of those levels by Master's degree recipients during their Master's program studies,

A 6.2.3 by multiplying the cost per SCH at each level (from A 6.2.1) by the number of SCH at that same level (from A 6.2.2), and

A 6.2.4 then by adding the five products calculated in A 6.2.3.

A 6.3 Determine the FAACUT based cost per Doctor's degree (the PROFAACUT Doctor's degree cost)

A 6.3.1 by determining the cost per SCH as calculated with the FAACUT procedure at the Lower Division, Upper Division, Master's Classes, Doctor's Classes, Independent Research, Thesis and Dissertation levels,

A 6.3.2 by determining the average number of SCH taken at each of those levels by Doctor's degree recipients during their Doctor's program studies - including SCH taken for a Master's degree if that degree was an integral part of the Doctor's program -

A 6.3.2.1 with the number of Doctor's Classes SCH being determined by subtracting the number of SCH taken at the Graduate Classes level by the average Master's degree recipient from the number of SCH taken at the Graduate Classes level by the average Doctor's degree recipient,

A 6.3.2.2 the number of Doctor's Classes SCH being equal to the difference (from A 6.3.2.1) if that difference is greater than or equal to zero, or

A 6.3.2.3 being set equal to zero if that difference is less than zero, while

A 6.3.2.4 the number of Master's Classes SCH is the difference between the number of SCH taken at the Graduate Classes level by the average Doctor's degree recipient and the number of Doctor's Classes SCH determined in A 6.3.2.2 and A 6.3.2.3,

A 6.3.3 and by multiplying the cost per SCH at each level (from A 6.3.1) by the number of SCH at that same level (from A 6.3.2), and

A 6.3.4 then by adding the seven products calculated in A 6.2.4.

A 6.4 Determine the COMPCUT based cost per Bachelor's degree (the PROCOMPCUT Bachelor's degree cost) by following the procedures of A 6.1 but using COMPCUT student credit hour cost estimates instead of FAACUT estimates.

A 6.5 Determine the COMPCUT based cost per Master's degree (the PROCOMPCUT Master's degree cost) by following the procedures of A 6.2 but using COMPCUT student credit hour cost estimates instead of FAACUT estimates.

A 6.6 Determine the COMPCUT based cost per Doctor's degree (the PROCOMPCUT Doctor's degree cost) by following the procedures of A 6.3 but using COMPCUT student credit hour cost estimates instead of FAACUT estimates.

APPENDIX A-7

Appendix A-7 is omitted.

APPENDIX A-8

Unit Formal Instruction Costs

A 8.1 Determine the Academic Year cost per head-count student in the Academic Year Undergraduate program

A 8.1.1 by dividing the Academic Year Lower Division Undergraduate partial program costs by the number of Autumn term students estimated to be in the Lower Division partial program, and

A 8.1.2 by dividing the Academic Year Upper Division Undergraduate partial program costs by the number of Autumn term students estimated to be in the Upper Division partial program, and

A 8.1.3 by taking the arithmetic mean of the two quotients.

A 8.2 Determine the Summer Term cost per head-count student in the Summer Term Undergraduate program by following the procedure of steps A 8.1.1 through A 8.1.3 but using Summer Term costs and Summer Term number of students instead of the Academic Year figures.

A 8.3 Determine the twelve-month year cost per average head-count student in the Undergraduate program

A 8.3.1 by adding the Academic Year cost per Lower Division student (A 8.1.1) to the Summer Term cost per Lower Division student (A 8.2),

A 8.3.2 by adding the Academic Year cost per Upper Division student (A 8.1.2) to the Summer Term cost per Upper Division student (A 8.2),

A 8.3.3 then taking the arithmetic mean of the sums.

A 8.4 Determine the Academic Year cost per head-count student in the Academic Year Master's level Graduate program by dividing the Master's level Academic Year program costs by the number of Autumn term students in the program.

A 8.5 Determine the Summer Term cost per head-count student in the Summer Term Master's level Graduate program by dividing the Master's level Summer Term program costs by the number of Summer Term students in the program.

A 8.6 Determine the cost per twelve-month year per average head-count student in the Master's level Graduate program by adding the Academic Year cost per student (A 8.4) to the Summer Term cost per student (A 8.5).

A 8.7 Determine the Academic Year cost per head-count student in the Academic Year Doctor's level Graduate program, the Summer Term cost per head-count student in the Summer Term Doctor's level Graduate program, and the twelve-month year cost per average head-count student in the Doctor's level Graduate program by following the procedures of A 8.4, A 8.5, and A 8.6 respectively but using Doctor's program costs and numbers of students instead of Master's program figures.

A 8.8 Determine the number of reported FTE students for a given time period

A 8.8.1 for Lower Division undergraduate students

A 8.8.1.1 by summing the student credit hours reported taken by Lower Division students known to be in the program,

A 8.8.1.2 by dividing that sum by the number of student credit hours reported to be "normally" taken by a full-time Lower Division student at the institution, and

A 8.8.2 for Upper Division undergraduate students, Master's program students and Doctor's program students by following the procedures of A 8.4.1 but using Upper Division, Masters' program and Doctors' program figures respectively instead of Lower Division figures.

A 8.9 Determine the Academic Year cost per FTE student in the Academic Year Lower Division and Upper Division Undergraduate partial programs, the Summer Term cost per FTE student in the Summer Term Undergraduate partial programs, and the twelve-month year cost per average FTE student in the Undergraduate partial programs

by following the procedures A 8.1 through A 8.3 but using FTE student figures instead of head-count student figures.

A 8.10 Determine the Academic Year cost per FTE student in the Academic Year Master's level Graduate program, the Summer Term cost per FTE student in the Summer Term Master's level Graduate program, and the twelve-month year cost per average FTE student in the Master's level Graduate program by following the procedures of A 8.4, A 8.5, and A 8.6 respectively but using FTE student figures instead of head-count student figures.

A 8.11 Determine the Academic Year cost per FTE student in the Academic Year Doctor's level Graduate program, the Summer Term cost per FTE student in the Summer Term Doctor's level Graduate program, and the twelve-month year cost per average FTE student in the Doctor's level Graduate program by following the procedures of A 8.4, A 8.5, and A 8.6 respectively but using Doctor's program costs and numbers of FTE students instead of Master's program costs and numbers of head-count students.

A 8.12 Determine the Academic Year cost per bachelor's degree granted

A 8.12.1 by adding the Academic Year Lower Division partial program cost to the Academic Year Upper Division partial program cost and

A 8.12.2 by dividing that sum

A 8.12.3 by the arithmetic mean of the numbers of bachelor's degrees granted in the program during the five years ending with the year for which the financial data has been gathered.

A 8.13 Determine the twelve-month year cost per bachelor's degree granted

A 8.13.1 by adding the Academic Year Lower Division and Upper Division partial programs' costs to the Summer Term Lower Division and Upper Division partial programs' costs,

A 8.13.2 and then by following the procedures set forth in A 8.12.2 and A 8.12.3.

A 8.14 Determine the Academic Year cost per Master's degree granted

A 8.14.1 by dividing the Master's level Academic Year program costs

A 8.14.2 by the arithmetic mean of the numbers of Master's degrees granted in the program during the five years ending with the year for which the financial data has been gathered.

A 8.15 Determine the twelve-month year cost per Master's degree granted

A 8.15.1 by adding the Academic Year Master's level program cost to the Summer Term Master's level program cost and then

A 8.15.2 dividing that sum

A 8.15.3 by the arithmetic mean calculated in A 8.14.2.

A 8.16 Determine the Academic Year cost per Doctor's degree granted by following the procedures of A 8.14 but using Doctor's program costs and numbers of degrees instead of Master's program figures.

A 8.17 Determine the twelve-month year cost per Doctor's degree granted by following the procedure of A 8.15 but using Doctor's program costs and numbers of degrees instead of Master's program figures.

APPENDIX A-9

Support Costs

Institutional expenditures are commonly listed in institutional financial reports under such headings as Instruction and Departmental Research, Sponsored Research, Other Separately Budgeted Research, Extension and Public Service, Libraries, Student Services, Operation and Maintenance of Plant, General Administration, General Institutional Expense, Student Aid, Transfers, Auxiliary Enterprises and Hospital. Of these expenditure classes, Libraries, Student Services, Operation and Maintenance of Plant, General Administration and General Institutional Expense will be considered to be "Support Costs."

The general procedure used in allocating support costs is to determine the total expenditures under a particular heading, to subtract from that amount the cost that can be attributed to grant and contract activities, and then to allocate the remainder according to some proxy that is presumably related to actual user benefits.

A 9.1 LIBRARY COSTS (See Table A 9.3):

A 9.1.1 Subtract the Libraries portion of indirect costs of grants and contracts (given in Table A 9.2) from the total libraries expenditures (given in Table A 9.1) in order to obtain the amount of Libraries expenditures to be allocated to the institution's educational activities.

A 9.1.2 Calculate the amount of Libraries cost to be allocated to the Bachelor's program

A 9.1.2.1 by computing a Bachelor's program allocation factor by multiplying the number of Autumn Term undergraduate students estimated to be associated with the program (not just those undergraduates who have formally registered as majors in the program) by one,

A 9.1.2.2 by computing an institutional weighted student allocation factor by multiplying the number of Autumn Term undergraduate students in the institution by one, multiplying the number of Autumn Term graduate and professional students by two, and summing the products,

A 9.1.2.3 by dividing the Bachelor's program allocation factor (A 9.1.2.1) by the institutional allocation factor (A 9.1.2.2), and

A 9.1.2.4 by multiplying the quotient A 9.1.2.3 by the allocable Libraries cost A 9.1.1.

A 9.1.3 Calculate the amount of Libraries cost to be allocated to the Master's program

A 9.1.3.1 by computing a Master's program allocation factor by multiplying the number of students in the Master's program by two, and then

A 9.1.3.2 by following the procedures of A 9.1.2.2 through A 9.1.2.4 but using the Master's program allocation factor instead of the Bachelor's program allocation factor.

A 9.1.4 Calculate the amount of Libraries cost to be allocated to the Doctor's program by following the procedure of A 9.1.3 but using the number of Doctor's students and the Doctor's program allocation factor instead of the number of Master's program students and the Master's program allocation factor, respectively.

A 9.2 STUDENT SERVICES COSTS (See Table A 9.4):

A 9.2.1 Subtract the Student Services portion of indirect costs of grants and contracts (given in Table A 9.2) from the total Student Services expenditures (given in Table A 10.2) in order to obtain the amount of Student Services expenditures to be allocated to the institution's educational activities.

A 9.2.2 Calculate the Student Services allocable cost per student enrolled in the institution by dividing the total amount to be allocated by the number of Autumn Term students enrolled in the institution.

A 9.2.3 Determine the allocation

A 9.2.3.1 to the undergraduate program by multiplying the Student Services cost per student (A 9.2.2) by the sum of the number of Freshmen and Sophomores estimated to be associated with the program and the number of Juniors and Seniors estimated to be associated with the program (from A 1.7.1 - A 1.7.8 or A 2.11.1 - A 2.11.3 or A 3.7.1 - A 3.7.3 or A 4.8.1 - A 4.8.3 or A 5.13.1 - A 5.13.3),

A 9.2.3.2 to the Master's program by multiplying the Student Services cost per student (A 9.2.2) by the number of Master's program students, and

A 9.2.3.3 to the Doctor's program by multiplying the Student Services cost per student (A 9.2.2) by the number of Doctor's program students.

A 9.3 PLANT OPERATION AND MAINTENANCE COSTS (See Table A 9.5):

A 9.3.1 First, in order to determine the amount of expenditure that should be allocated to "Educational" activity it is necessary to separate out expenditures for Auxiliary Enterprises and for Sponsored Research.

A 9.3.1.1 Begin with the amount of net usable space available to the institution. From that figure subtract the area which is of the nature of parking lots or separately maintained facilities that can be expected to require minimal expenditures through the Plant Operation and Maintenance accounts, leaving the square feet of "basic" space to be used for cost allocation purposes.

A 9.3.1.2 Determine if the costs of Plant Operation and Maintenance services to the institution's Auxiliary Enterprises are reported as a net cost to the Plant Operation and Maintenance account. If such costs are not a net cost to that account, do not make any adjustment. If such costs are a net cost to that account, obtain the ratio of the number of square feet of Auxiliary Enterprises space to the number of square feet of "basic" space in the institu-

tion and multiply that ratio by the Plant Operation and Maintenance expenditures. Then subtract the resulting product--which is the estimated cost of Auxiliary Enterprises' plant operation and maintenance--from the Plant Operation and Maintenance expenditures figure to yield an "intermediate" Plant Operation and Maintenance expenditures estimate.

A 9.3.1.3 Determine if the costs of Plant Operation and Maintenance services to the Institution's Hospital are reported as a net cost to the Plant Operation and Maintenance account. If such costs are not a net cost to that account, do not make any adjustment. If such costs are a net cost to that account, obtain the ratio of the number of square feet of Hospital space to the number of square feet of "basic" space in the institution and multiply that ratio by the Plant Operation and Maintenance expenditures. Then subtract the resulting product--which is the estimated cost of the Hospital's Plant Operation and Maintenance--from the "intermediate" Plant Operation and Maintenance expenditures figure to yield a "reduced" Plant Operation and Maintenance expenditures estimate.

A 9.3.1.4 Separate the costs of Sponsored Research from program instructional costs by subtracting the indirect costs for Plant Operation and Maintenance that are estimated to be associated with Sponsored Research activities from the "reduced" Plant Operation and Maintenance expenditures estimate calculated in A 9.3.1.3 to obtain a "net" Plant Operation and Maintenance expenditures estimate. After subtracting the Sponsored Research cost and the Auxiliary Enterprises and Hospital costs from the total Plant Operation and Maintenance expenditures, the amount remaining is left to be allocated among the educational programs.

A 9.3.2 The second step in this allocation procedure is to allocate costs to the department based upon the fraction of the total Instruction and Classrooms space in the institution that is occupied by the department.

A 9.3.2.1 Divide the department's square feet area of Instruction and Classrooms space by the square feet of such space in the institution, and

A 9.3.2.2 multiply the quotient A 9.3.2.1 by the "net" Plant Operation and Maintenance expenditures estimate A 9.3.1.3 to obtain the department's allocation for Plant Operation and Maintenance.

A 9.3.3 The third step in the procedure is to allocate the department's allocation to the Undergraduate, Master's and Doctor's programs.

A 9.3.3.1 If the department's service load is positive (i.e., if more student credit hours are provided by the department to other programs' students than are provided by other departments to the parent department's majors) or zero then determine a Plant Operation and Maintenance departmental allocation factor

A 9.3.3.1.1 by multiplying the number of Autumn Term students estimated to be associated with the Bachelor's program (from A 1.7.6 - A 1.7.8 or A 2.11.1 - A 2.11.3 or A 3.7.1 - A 3.7.3 or A 4.8.1 - A 4.8.3 or A 5.13.1 - A 5.13.3) by two,

A 9.3.3.1.2 by multiplying the number of Autumn Term students in the Master's program by three,

A 9.3.3.1.3 by multiplying the number of Autumn Term students in the Doctor's program by five, and

A 9.3.3.1.4 by multiplying the number of Autumn Term full-time-equivalent students in the department's service load by two, then

A 9.3.3.1.5 by summing the products from A 9.3.3.1.1, A 9.3.3.1.2, A 9.3.3.1.3 and A 9.3.3.1.4.

A 9.3.3.2 If the department's service load is negative, then determine Plant Operation and Maintenance departmental allocation factor

A 9.3.3.2.1 by following the procedures of A 9.3.3.1.1, A 9.3.3.1.2 and A 9.3.3.1.3, and

A 9.3.3.2.2 by summing the three products.

A 9.3.3.3 If the department's service load is positive or zero, determine the Plant Operation and Maintenance cost allocable to the Bachelor's program

A 9.3.3.3.1 by multiplying the number of Autumn Term students estimated to be associated with the Bachelor's program by two,

A 9.3.3.3.2 by dividing that product by the allocation factor (from A 9.3.3.1), and

A 9.3.3.3.3 by multiplying that quotient by the department's allocation for Plant Operation and Maintenance.

A 9.3.3.4 If the department's service load is negative, determine the Plant Operation and Maintenance cost allocable to the Bachelor's program

A 9.3.3.4.1 by following the procedure of A 9.3.3.3.1, then

A 9.3.3.4.2 by dividing that product by the allocation factor (from A 9.3.3.2),

A 9.3.3.4.3 by dividing the absolute value of the full-time-equivalent student value of the service load by the allocation factor (from A 9.3.3.2),

A 9.3.3.4.4 by adding the two quotients A 9.3.3.4.2 and A 9.3.3.4.3, and

A 9.3.3.4.5 by multiplying that sum by the department's allocation for Plant Operation and Maintenance.

A 9.3.3.5 Determine the Plant Operation and Maintenance cost allocable to the Master's program

A 9.3.3.5.1 by multiplying the number of Autumn Term Master's program students by three, then

A 9.3.3.5.2 by following the procedures of A 9.3.3.3.2 and A 9.3.3.3.3.

A 9.3.3.6 Determine the Plant Operation and Maintenance cost allocable to the Doctor's program

A 9.3.3.6.1 by multiplying the number of Autumn Term Doctor's program students by five, then

A 9.3.3.6.2 by following the procedures of A 9.3.3.3.2 and A 9.3.3.3.3.

A 9.4 GENERAL ADMINISTRATION AND GENERAL INSTITUTIONAL EXPENSE COSTS

(See Table A 9.6):

A 9.4.1 Determine the net amount of General Administration and General Institutional costs after accounting for the costs associated with Auxiliary Enterprises, Hospital and Sponsored Research Activities.

A 9.4.1.1 Add the General Administration unrestricted funds expenditure to the General Institutional Expense unrestricted funds expenditure. Call the sum "General" for short.

A 9.4.1.2 Subtract the indirect costs for General Administration and for General Institutional Expense estimated to be costs of Sponsored Research from the "General" expenditures of A 9.4.1.1.

A 9.4.1.3 Divide the sum of all the Auxiliary Enterprises and Hospital expenditures by the sum of the institution's unrestricted funds expenditures for Educational activities and all the Auxiliary Enterprises and Hospital activities expenditures, and

A 9.4.1.4 multiply that quotient by the difference from A 9.4.1.2 (the reduced General expenditures) to obtain the amount of General costs to be allocated to the Auxiliary Enterprises and the Hospital.

A 9.4.1.5 Subtract the product A 9.4.1.4 from the reduced General expenditures A 9.4.1.2 to obtain the net General cost to be allocated to Educational activities.

A 9.4.2 Allocate the net General cost to the department on the basis of its share of full-time equivalent (F.T.E.) Autumn Term faculty by

A 9.4.2.1 dividing the number of F.T.E. faculty in the department by the number of F.T.E. faculty in the institution and

A 9.4.2.2 multiplying the quotient A 9.4.2.1 by the net General cost A 9.4.1.5 to obtain the department's share of the net General costs.

A 9.4.3 Allocate the net General cost to the Bachelor's, Master's and Doctor's programs.

A 9.4.3.1 Determine a General cost departmental allocation factor

A 9.4.3.1.1 by multiplying the number of Autumn Term students estimated to be associated with the Bachelor's program (from A 1.7.6 - A 1.7.8 or A 2.11.1 - A 2.11.3 or A 3.7.1 - A 3.7.3 or A 4.8.1 - A 4.8.3 or A 5.13.1 - A 5.13.3) by two,

A 9.4.3.1.2 by multiplying the number of Autumn Term students in the Master's program by three,

A 9.4.3.1.3 by multiplying the number of Autumn Term students in the Doctor's program by five, and

A 9.4.3.1.4 by multiplying the number of Autumn Term full-time-equivalent students in the department's service load by two, then

A 9.4.3.1.5 summing the products from A 9.4.3.1.1, A 9.4.3.1.2, A 9.4.3.1.3 and A 9.4.3.1.4.

A 9.4.3.2 Determine the General cost allocable to the Bachelor's program

A 9.4.3.2.1 by multiplying the number of Autumn Term students estimated to be associated with the Bachelor's program by two,

A 9.4.3.2.2 by dividing that product by the allocation factor (from A 9.4.3.1), and

A 9.4.3.2.3 by multiplying that quotient by the department's allocation for General cost.

A 9.4.3.3 Determine the General cost allocable to the Master's program

A 9.4.3.3.1 by multiplying the number of Autumn Term Master's program students by three, then

A 9.4.3.3.2 by following the procedures of A 9.4.3.2.2 and A 9.4.3.2.3.

A 9.4.3.4 Determine the General cost allocable to the Doctor's program

A 9.4.3.4.1 by multiplying the number of Autumn Term Doctor's program students by five, then

A 9.4.3.4.2 by following the procedures of A 9.4.3.2.2 and A 9.4.3.2.3.

A 9.5 TOTAL SUPPORT COSTS ALLOCATED TO THE PROGRAMS:

A 9.5.1 Calculate

A 9.5.1.1 the total institutional support cost allocated to the Bachelor's program to be the sum of the Libraries, Student Services, Plant Operation and Maintenance and General Administration and General Institutional Expense Bachelor's program allocations; and

A 9.5.1.2 calculate the Master's program support cost and the Doctor's program support cost by following the procedure of A 9.5.1.1 but using Master's program and Doctor's program support cost figures, respectively, instead of Bachelor's cost figures.

APPENDIX C
ILLUSTRATIVE CALCULATIONS

1109 CHEMISTRY

CLASSCUT

DETAILS OF THE CLASSCUT PROCEDURE CALCULATIONS

ACADEMIC YEAR:

A1.1 DEPARTMENTAL COSTS BY CATEGORY:

A1.1.1	CATEGORY 1 (PERSONNEL)	$ 1016823
A1.1.2	CATEGORY 2A (T.A.S)	299368
A1.1.3	CATEGORY 2B (R.A.S, ETC.)	0
A1.1.4	CATEGORY 3 (OPERATIONS)	160027

A1.2 DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES:

(A) INSTITUTIONS TOTAL INDIRECT COSTS OF DEPARTMENTAL ADMINISTRATION $ 3399912

(B) RATIO OF DEPARTMENTS GRANT AND CONTRACT EXPENDITURES TO TOTAL INSTITUTIONS GRANT AND CONTRACT EXPENDITURES

($ 508071)/($ 69084618) = .0073543

(C) PRODUCT OF (A) AND (B) $ 25004

A1.3 NET CATEGORY 1 DEPARTMENTAL COST $ 991819

A1.4 NUMBERS OF CLASSES:

A1.4.1	NUMBER LOWER DIVISION CLASSES	22.00
	NUMBER UPPER DIVISION CLASSES	10.00
	NUMBER MASTERS CLASSES	13.00
	NUMBER DOCTORS CLASSES	2.00
A1.4.2	(CLASS EQUIVALENTS (C.E.):	
	(483)/(15) = 32.20 SCH/CLASS)	
	(EQUIVALENCE FACTOR: 1.00)	
A1.4.2.4	NUMBER INDEPENDENT STUDY C.E.	7.52
A1.4.2.5	NUMBER THESIS C.E.	.56
	NUMBER DISSERTATION C.E.	13.20
	TOTAL	68.27

A1.5 DISTRIBUTION OF CLASSES TO LEVELS:

		LDUA*	UDUA	MP	DP
A1.5.1	LOWER DIVISION	22.0	.0	.0	.0
A1.5.2	UPPER DIVISION	.0	8.6	.7	.7
	MASTERS CLASSES	.0	.8	4.6	7.5
A1.5.3	DOCTORS CLASSES	.0	.0	.9	1.1
A1.5.4	INDEPENDENT STUDY	.0	.0	3.2	4.3
	THESIS	.0	.0	.3	.3
	DISSERTATION	.0	.0	.0	13.2
A1.6	TOTALS	22.0	9.4	9.7	27.2

* LDUA ≡ LOWER DIVISION UNDERGRADUATE ACTIVITY
UDUA ≡ UPPER DIVISION UNDERGRADUATE ACTIVITY
MP ≡ MASTERS PROGRAM
DP ≡ DOCTORS PROGRAM

A1.7 ALLOCATION OF COSTS TO ACTIVITIES AND PROGRAMS:

		LDUA	UDUA	MP	DP
A1.7.1	CATEGORY 1	319598	137136	140448	394637
A1.7.2	CATEGORY 2A	239494	59874	0	0
A1.7.3	CATEGORY 2B	0	0	0	0
A1.7.4	CATEGORY 3	51566	22126	22661	63673
A1.7.5	TOTALS	610659	219136	163109	458310
				621419	

ALLOCATION OF ACTIVITY COSTS TO THE BACHELORS PROGRAM AND TO THE SERVICE FUNCTION:

A1.7.6 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A1.7.7 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(136)/(.753) = 180.67

A1.7.8 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
180.67

A1.7.9 ESTIMATED FRESHMEN-SOPHOMORE SCH
(180.67)*(15.00) = 2710.08

A1.7.10 ESTIMATED JUNIOR-SENIOR SCH
(180.67)*(15.00) = 2710.08

A1.7.11		BACHELORS PROGRAM	SERVICE FUNCTION
	LDUA	$ 100683	509975
	UDUA	402627	-183491
A1.7.15	TOTAL	$ 503311	

A1.8 SUMMER TERM:

A1.1 DEPARTMENTAL COSTS BY CATEGORY:

A1.1.1	CATEGORY 1 (PERSONNEL)	$	129752
A1.1.2	CATEGORY 2A (T.A.S)		19954
A1.1.3	CATEGORY 2B (R.A.S, ETC.)		0
A1.1.4	CATEGORY 3 (OPERATIONS)		670

A1.2 DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES ARE ASSUMED TO BE $ 0

A1.3 NET CATEGORY 1 DEPARTMENTAL COST $ 129752

A1.4 NUMBERS OF CLASSES:

A1.4.1	NUMBER LOWER DIVISION CLASSES	16.00
	NUMBER UPPER DIVISION CLASSES	7.00
	NUMBER MASTERS CLASSES	4.00
	NUMBER DOCTORS CLASSES	2.00
A1.4.2	(CLASS EQUIVALENTS (C.E.):	
	(139)/(6) = 23.17 SCH/CLASS)	
	(EQUIVALENCE FACTOR: 1.00)	
A1.4.2.4	NUMBER INDEPENDENT STUDY C.E.	11.78
A1.4.2.5	NUMBER THESIS C.E.	.82
	NUMBER DISSERTATION C.E.	19.60
	TOTAL	61.20

A1.5 DISTRIBUTION OF CLASSES TO LEVELS:

		LDUA*	UDUA	MP	DP
A1.5.1	LOWER DIVISION	16.0	.0	.0	.0
A1.5.2	UPPER DIVISION	.0	5.7	1.1	.2
	MASTERS CLASSES	.0	.1	2.2	1.8
A1.5.3	DOCTORS CLASSES	.0	.0	.5	1.5
A1.5.4	INDEPENDENT STUDY	.0	.0	8.0	3.8
	THESIS	.0	.0	.8	.0
	DISSERTATION	.0	.0	4.8	14.8
A1.6	TOTALS	16.0	5.7	17.5	22.0

* LDUA ≡ LOWER DIVISION UNDERGRADUATE ACTIVITY
UDUA ≡ UPPER DIVISION UNDERGRADUATE ACTIVITY
MP ≡ MASTERS PROGRAM
DP ≡ DOCTORS PROGRAM

A1.7 ALLOCATION OF COSTS TO ACTIVITIES AND PROGRAMS:

		LDUA	UDUA	MP	DP
A1.7.1	CATEGORY 1	33921	12148	37024	46659
A1.7.2	CATEGORY 2A	15963	3991	0	0
A1.7.3	CATEGORY 2B	0	0	0	0
A1.7.4	CATEGORY 3	175	63	191	241
A1.7.5	TOTALS	50060	16201	37215	46900
				84115	

ALLOCATION OF ACTIVITY COSTS TO THE BACHELORS PROGRAM AND TO THE SERVICE FUNCTION:

A1.7.6 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A1.7.7 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(58)/(.753) = 77.05

A1.7.8 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
77.05

A1.7.9 ESTIMATED FRESHMEN-SOPHOMORE SCH
(77.05)*(15.00) = 1155.77

A1.7.10 ESTIMATED JUNIOR-SENIOR SCH
(77.05)*(15.00) = 1155.77

A1.7.11		BACHELORS PROGRAM	SERVICE FUNCTION
	LDUA	$ 15182	34878
	UDUA	51022	-34820
A1.7.15	TOTAL	$ 66203	

A1.9	PARTIAL PROGRAM COSTS:		
A1.9.1	ACADEMIC YEAR:		
	LOWER DIVISION	$	100683
	UPPER DIVISION		402627
A1.9.2	SUMMER TERM:		
	LOWER DIVISION	$	15182
	UPPER DIVISION		51022
A1.10	TWELVE-MONTH PROGRAM COSTS:		
A1.10.1	BACHELORS PROGRAM	$	569514
A1.10.2	MASTERS PROGRAM		200324
	DOCTORS PROGRAM		505210
A1.10.3	(COMBINED GRADUATE PROGRAMS		705534)

SUMMARY OF PROGRAM DEPARTMENTAL COST ANALYSIS

PROGRAM	PROGRAM COST	ESTIMATED NUMBER STUDENTS	COST PER STUDENT
BACHELORS	$ 569514	361.3	$ 1576
MASTERS	200324	33.0	6070
DOCTORS	505210	78.0	6477
(GRADUATE	705534	111.0	6356)

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CLADCUT

DETAILS OF THE CLADCUT PROCEDURE CALCULATIONS

ACADEMIC YEAR:

A2.1	DEPARTMENTAL COSTS BY CATEGORY:		
A2.1.1	CATEGORY 1A (FACULTY)	$	715279
A2.1.2	CATEGORY 1B (STAFF)		301544
A2.1.3	CATEGORY 2A (T.A.S)		299368
A2.1.4	CATEGORY 2B (R.A.S, ETC.)		0
A2.1.5	CATEGORY 3 (OPERATIONS)		160027
A2.2	DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES:		
	(A) INSTITUTIONS TOTAL INDIRECT COSTS OF DEPARTMENTAL ADMINISTRATION	$	3399912
	(B) RATIO OF DEPARTMENTS GRANT AND CONTRACT EXPENDITURES TO TOTAL INSTITUTIONS GRANT AND CONTRACT EXPENDITURES		
	($ 508071)/($ 69084618) =		.0073543
	(C) PRODUCT OF (A) AND (B)	$	25004
A2.3	NET CATEGORY 1A DEPARTMENTAL COST	$	690275
A2.4	NUMBERS OF CLASSES:		
A2.4.1	NUMBER LOWER DIVISION CLASSES		22.00
	NUMBER UPPER DIVISION CLASSES		10.00
	NUMBER MASTERS CLASSES		13.00
	NUMBER DOCTORS CLASSES		2.00
A2.4.2	(CLASS EQUIVALENTS (C.E.):		
	(483)/(15) = 32.20 SCH/CLASS)		
	(EQUIVALENCE FACTOR: 1.00)		
A2.4.2.4	NUMBER INDEPENDENT STUDY C.E.		7.52
A2.4.2.5	NUMBER THESIS C.E.		.56
	NUMBER DISSERTATION C.E.		13.20
	TOTAL		68.27

A2.5 DISTRIBUTION OF CLASSES TO LEVELS:

		LDUA*	UDUA	MP	DP
A2.5.1	LOWER DIVISION	22.0	.0	.0	.0
A2.5.2	UPPER DIVISION	.0	8.6	.7	.7
	MASTERS CLASSES	.0	.8	4.6	7.5
A2.5.3	DOCTORS CLASSES	.0	.0	.9	1.1
A2.5.4	INDEPENDENT STUDY	.0	.0	3.2	4.3
	THESIS	.0	.0	.3	.3
	DISSERTATION	.0	.0	.0	13.2
A2.6	TOTALS	22.0	9.4	9.7	27.2

* LDUA ≡ LOWER DIVISION UNDERGRADUATE ACTIVITY
UDUA ≡ UPPER DIVISION UNDERGRADUATE ACTIVITY
MP ≡ MASTERS PROGRAM
DP ≡ DOCTORS PROGRAM

A2.7 ALLOCATION OF COSTS TO ACTIVITIES AND PROGRAMS:

		LDUA	UDUA	MP	DP
A2.7.1	CATEGORY 1A	222430	95442	97747	274655
SEE A2.9	CATEGORY 1B	219068	18559	16837	47080
A2.7.2	CATEGORY 2A	239494	59874	0	0
A2.7.3	CATEGORY 2B	0	0	0	0
SEE A2.9	CATEGORY 3	116258	9849	8935	24985
A2.10.1	TOTALS $	797250	183725	123520	346719
A2.10.3				$ 470239	

A2.8 DEPARTMENTAL STUDENT CREDIT HOUR PARTIAL COSTS:

A2.8.1 NUMBER WEIGHTED SCH
(1.0X 17912)+(4.0X 1168) = 22584

A2.8.2 CATEGORY 1B PARTIAL COST
A2.8.2.1 PER UNIT WEIGHTED SCH $ 13.352

A2.8.2.2 CATEGORY 3 PARTIAL COST
PER UNIT WEIGHTED SCH $ 7.086

A2.8.3 SCH TAKEN BY STUDENTS:

		LOWER DIVISION	UPPER DIVISION	GRADUATE
A2.8.3.1	UNDERGRADUATE STUDENTS	16407	1270	30
A2.8.3.3	MASTERS LEVEL STUDENTS	25	96	285
A2.8.3.4	DOCTORS LEVEL STUDENTS	5	109	853

A2.9 ALLOCATION OF CATEGORY 1B ABD CATEGORY 3 COSTS TO PROGRAMS AND ACTIVITIES:

		CATEGORY 1B	CATEGORY 3
A2.9.1	LOWER DIVISION ACTIVITY 16407 X 1.0 = 16407;	$ 219068	116258
A2.9.2	UPPER DIVISION ACTIVITY 1270X1 + 30X4 = 1390;	18559	9849
A2.9.3	MASTERS PROGRAM 121X1 + 285X4 = 1261;	16837	8935
	DOCTORS PROGRAM 114X1 + 853X4 = 3526;	47080	24985

ALLOCATION OF ACTIVITY COSTS TO THE BACHELORS PROGRAM AND TO THE SERVICE FUNCTION:

A2.11.1 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A2.11.2 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(136)/(.753) = 180.67

A2.11.3 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
180.67

A2.11.4 ESTIMATED FRESHMEN-SOPHOMORE SCH
(180.67)*(15.00) = 2710.08

A2.11.5 ESTIMATED JUNIOR-SENIOR SCH
(180.67)*(15.00) = 2710.08

		BACHELORS PROGRAM	SERVICE FUNCTION
A2.11.6	LDUA	$ 131448	665803
A2.11.8	UDUA	337565	-153840
A2.11.10	TOTAL	$ 469013	

A2.11 SUMMER TERM:

A2.1 DEPARTMENTAL COSTS BY CATEGORY:

A2.1.1	CATEGORY 1A (FACULTY)	$	53836
A2.1.2	CATEGORY 1B (STAFF)		75916
A2.1.3	CATEGORY 2A (T.A.S)		19954
A2.1.4	CATEGORY 2B (R.A.S, ETC.)		0
A2.1.5	CATEGORY 3 (OPERATIONS)		670

A2.2 DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES ARE ASSUMED TO BE $ 0

A2.3 NET CATEGORY 1A DEPARTMENTAL COST $ 53836

A2.4 NUMBERS OF CLASSES:

A2.4.1	NUMBER LOWER DIVISION CLASSES	16.00
	NUMBER UPPER DIVISION CLASSES	7.00
	NUMBER MASTERS CLASSES	4.00
	NUMBER DOCTORS CLASSES	2.00
A2.4.2	(CLASS EQUIVALENTS (C.E.):	
	(139)/(6) = 23.17 SCH/CLASS)	
	(EQUIVALENCE FACTOR: 1.00)	
A2.4.2.4	NUMBER INDEPENDENT STUDY C.E.	11.78
A2.4.2.5	NUMBER THESIS C.E.	.82
	NUMBER DISSERTATION C.E.	19.60
	TOTAL	61.20

A2.5 DISTRIBUTION OF CLASSES TO LEVELS:

		LDUA*	UDUA	MP	DP
A2.5.1	LOWER DIVISION	16.0	.0	.0	.0
A2.5.2	UPPER DIVISION	.0	5.7	1.1	.2
	MASTERS CLASSES	.0	.1	2.2	1.8
A2.5.3	DOCTORS CLASSES	.0	.0	.5	1.5
A2.5.4	INDEPENDENT STUDY	.0	.0	8.0	3.8
	THESIS	.0	.0	.8	.0
	DISSERTATION	.0	.0	4.8	14.8
A2.6	TOTALS	16.0	5.7	17.5	22.0

* LDUA ≡ LOWER DIVISION UNDERGRADUATE ACTIVITY
UDUA ≡ UPPER DIVISION UNDERGRADUATE ACTIVITY
MP ≡ MASTERS PROGRAM
DP ≡ DOCTORS PROGRAM

A2.7 ALLOCATION OF COSTS TO ACTIVITIES AND PROGRAMS:

		LDUA	UDUA	MP	DP
A2.7.1	CATEGORY 1A	14074	5040	15362	19359
SEE A2.9	CATEGORY 1B	37033	3000	16190	19692
A2.7.2	CATEGORY 2A	15963	3991	0	0
A2.7.3	CATEGORY 2B	0	0	0	0
SEE A2.9	CATEGORY 3	327	26	143	174
A2.10.1	TOTALS $	67398	12058	31695	39225
A2.10.3				$ 70920	

A2.8 DEPARTMENTAL STUDENT CREDIT HOUR PARTIAL COSTS:

A2.8.1 NUMBER WEIGHTED SCH
(1.0X 4178)+(4.0X 885) = 7718

A2.8.2 CATEGORY 1B PARTIAL COST
A2.8.2.1 PER UNIT WEIGHTED SCH $ 9.836

CATEGORY 3 PARTIAL COST
A2.8.2.2 PER UNIT WEIGHTED SCH $ .087

A2.8.3 SCH TAKEN BY STUDENTS:

		LOWER DIVISION	UPPER DIVISION	GRADUATE
A2.8.3.1	UNDERGRADUATE STUDENTS	3765	297	2
A2.8.3.3	MASTERS LEVEL STUDENTS	38	60	387
A2.8.3.4	DOCTORS LEVEL STUDENTS	8	10	496

A2.9 ALLOCATION OF CATEGORY 1B ABD CATEGORY 3 COSTS TO PROGRAMS AND ACTIVITIES:

		CATEGORY 1B	CATEGORY 3
A2.9.1	LOWER DIVISION ACTIVITY 3765 X 1.0 = 3765;	$ 37033	327
A2.9.2	UPPER DIVISION ACTIVITY 297X1 + 2X4 = 305;	3000	26
A2.9.3	MASTERS PROGRAM 98X1 + 387X4 = 1646;	16190	143
	DOCTORS PROGRAM 18X1 + 496X4 = 2002;	19692	174

ALLOCATION OF ACTIVITY COSTS TO THE BACHELORS PROGRAM AND TO THE SERVICE FUNCTION:

A2.11.1 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A2.11.2 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(58)/(.753) = 77.05

A2.11.3 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
77.05

A2.11.4 ESTIMATED FRESHMEN-SOPHOMORE SCH
(77.05)*(15.00) = 1155.77

A2.11.5 ESTIMATED JUNIOR-SENIOR SCH
(77.05)*(15.00) = 1155.77

		BACHELORS PROGRAM	SERVICE FUNCTION
A2.11.6	LDUA	$ 20440	46958
A2.11.8	UDUA	37972	-25915
A2.11.10	TOTAL	$ 58412	

A2.13 PARTIAL PROGRAM COSTS:

A2.13.1	ACADEMIC YEAR:	
	LOWER DIVISION	$ 131448
	UPPER DIVISION	337565
A2.13.2	SUMMER TERM:	
	LOWER DIVISION	$ 20440
	UPPER DIVISION	37972

A2.14 TWELVE-MONTH PROGRAM COSTS:

A2.14.1	BACHELORS PROGRAM	$ 527425
A2.14.2	MASTERS PROGRAM	155215
	DOCTORS PROGRAM	385944
A2.14.3	(COMBINED GRADUATE PROGRAMS	541159)

SUMMARY OF PROGRAM DEPARTMENTAL COST ANALYSIS

PROGRAM	PROGRAM COST	ESTIMATED NUMBER STUDENTS	COST PER STUDENT
BACHELORS	$ 527425	361.3	$ 1460
MASTERS	155215	33.0	4703
DOCTORS	385944	78.0	4948
(GRADUATE	541159	111.0	4875)

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CREDCUT

DETAILS OF THE CREDCUT PROCEDURE CALCULATIONS

ACADEMIC YEAR:

A3.1.1	TOTAL DEPARTMENTAL COSTS:	$ 1476218
A3.1.2	DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES:	
	(A) INSTITUTIONS TOTAL INDIRECT COSTS OF DEPARTMENTAL ADMINISTRATION	$ 3399912
	(B) RATIO OF DEPARTMENTS GRANT AND CONTRACT EXPENDITURES TO TOTAL INSTITUTIONS GRANT AND CONTRACT EXPENDITURES	
	($ 508071)/($ 69084618) =	.0073543
	(C) PRODUCT OF (A) AND (B)	$ 25004
A3.1.3	NET DEPARTMENTAL COST:	$ 1451214
A3.2	DEPARTMENTAL STUDENT CREDIT HOURS GENERATED DURING THE ACADEMIC YEAR:	57240
A3.3	DEPARTMENTAL COST PER STUDENT CREDIT HOUR: ($ 1451214)/(57240) =	$ 25.35

A3.4 STUDENT CREDIT HOURS BY STUDENT LEVEL:

BACHELORS PROGRAM:

A3.4.1 LOWER DIVISION 0 SCH

A3.4.2 UPPER DIVISION 0 SCH

A3.4.3 MASTERS PROGRAM 1344 SCH

A3.4.4 DOCTORS PROGRAM 2907 SCH

A3.5 DEPARTMENTAL COSTS OF PROGRAMS:

A3.5.1 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A3.5.2 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(136)/(.753) = 180.67

A3.5.3 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
180.67

A3.5.4 LOWER DIVISION PARTIAL PROGRAM COST:

A3.5.4.1 RAW SUB-PROGRAM COST
($ 25.35)*(0) = $ 0

A3.5.4.2 ADJUSTED COST
($ 0)*(180.67 / 59) = $ 0

A3.5.5 UPPER DIVISION PARTIAL PROGRAM COST:
RAW SUB-PROGRAM COST
($ 25.35)*(0) = $ 0
ADJUSTED COST
($ 0)*(180.67 / 136) = $ 0

A3.5.6 MASTERS PROGRAM COST $ 34075

DOCTORS PROGRAM COST $ 73702

A3.5.7 BACHELORS PROGRAM COST $ 0

A3.5.8 GRADUATE PROGRAMS COST $ 107776

A3.6 SUMMER TERM:

A3.1.1	TOTAL DEPARTMENTAL COSTS:	$	150376
	DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES ARE ASSUMED TO BE	$	0
A3.1.3	NET DEPARTMENTAL COST:	$	150376

A3.2	DEPARTMENTAL STUDENT CREDIT HOURS GENERATED DURING THE SUMMER TERM:	5063

A3.3 DEPARTMENTAL COST PER STUDENT CREDIT HOUR:
($ 150376)/(5063) = $ 29.70

A3.4 STUDENT CREDIT HOURS BY STUDENT LEVEL:

BACHELORS PROGRAM:

A3.4.1 LOWER DIVISION 102 SCH

A3.4.2 UPPER DIVISION 637 SCH

A3.4.3 MASTERS PROGRAM 414 SCH

A3.4.4 DOCTORS PROGRAM 518 SCH

A3.5 DEPARTMENTAL COSTS OF PROGRAMS:

A3.5.1 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A3.5.2 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(58)/(.753) = 77.05

A3.5.3 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
77.05

A3.5.4 LOWER DIVISION PARTIAL PROGRAM COST:

A3.5.4.1 RAW SUB-PROGRAM COST
($ 29.70)*(102) = $ 3029

A3.5.4.2 ADJUSTED COST
($ 3029)*(77.05 / 10) = $ 23343

A3.5.5 UPPER DIVISION PARTIAL PROGRAM COST:
RAW SUB-PROGRAM COST
($ 29.70)*(637) = $ 18920
ADJUSTED COST
($ 18920)*(77.05 / 58) = $ 25134

A3.5.6 MASTERS PROGRAM COST $ 12296

DOCTORS PROGRAM COST $ 15385

A3.5.7 BACHELORS PROGRAM COST $ 48477

A3.5.8 GRADUATE PROGRAMS COST $ 27681

A3.7	PARTIAL PROGRAM COSTS:		
A3.7.1	ACADEMIC YEAR:		
	LOWER DIVISION	$	0
	UPPER DIVISION		0
A3.7.2	SUMMER TERM:		
	LOWER DIVISION	$	23343
	UPPER DIVISION		25134
A3.8	TWELVE-MONTH PROGRAM COSTS:		
A3.8.1	BACHELORS PROGRAM	$	48477
A3.8.2	MASTERS PROGRAM		46371
	DOCTORS PROGRAM		89087
A3.8.3	(COMBINED GRADUATE PROGRAMS		135458)

SUMMARY OF PROGRAM DEPARTMENTAL COST ANALYSIS

PROGRAM	PROGRAM COST	ESTIMATED NUMBER STUDENTS	COST PER STUDENT
BACHELORS	$ 48477	361.3	$ 134
MASTERS	46371	33.0	1405
DOCTORS	89087	78.0	1142
(GRADUATE	135458	111.0	1220)

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FAACUT

DETAILS OF THE FAACUT PROCEDURE CALCULATIONS

ACADEMIC YEAR:

A4.1	GROSS DEPARTMENTAL COSTS (OTHER THAN T.A. STIPENDS):	$	1176850
A4.2	DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES:		
	(A) INSTITUTIONS TOTAL INDIRECT COSTS OF DEPARTMENTAL ADMINISTRATION	$	3399912
	(B) RATIO OF DEPARTMENTS GRANT AND CONTRACT EXPENDITURES TO TOTAL INSTITUTIONS GRANT AND CONTRACT EXPENDITURES		
	($ 508071)/($ 69084618)	=	.0073543
	(C) PRODUCT OF (A) AND (B)	$	25004
A4.3	NET NON-T.A. DEPARTMENTAL COST	$	1151846

A4.4 FACULTY ACTIVITY ANALYSIS DISTRIBUTION:

LOWER DIVISION CLASSES		.216
UPPER DIVISION CLASSES		.125
GRADUATE LEVEL CLASSES		.084
INDEPENDENT STUDY-THESIS		.070
DISSERTATION		.066
(TOTAL INSTRUCTION TIME:	.561)	
SCHOLARLY AND OTHER ACTIVITY		.439
TOTAL		1.000

A4.5 ALLOCATION OF COST (A4.3) TO LEVELS:

A4.5.1 NET DEPARTMENTAL NON-T.A. INSTRUCTION COSTS:

LOWER DIVISION CLASSES			
$ 383949 X (.216/ .561) =		$	147830
UPPER DIVISION CLASSES			
$ 383949 X (.125/ .561) =		$	85550
GRADUATE LEVEL CLASSES			
$ 383949 X (.084/ .561) =		$	57490
INDEPENDENT STUDY-THESIS			
$ 383949 X (.070/ .561) =		$	47908
DISSERTATION			
$ 383949 X (.066/ .561) =		$	45170

A4.5.2 TEACHING ASSISTANTSHIP STIPENDS:

LOWER DIVISION	.80 X $ 99789 =	$	79831
UPPER DIVISION	.20 X $ 99789 =	$	19958

A4.5.3 TOTAL DEPARTMENTAL COST ALLOCATION:

LOWER DIVISION CLASSES	$	227662
UPPER DIVISION CLASSES	$	105508
GRADUATE LEVEL CLASSES	$	57490
INDEPENDENT STUDY-THESIS	$	47908
DISSERTATION	$	45170

A4.6 GENERATION AND COSTING OF DEPARTMENTAL SCH:

	SCH PER AUTUMN TERM		COST/SCH
LOWER DIVISION CLASSES	16437	$	13.85
UPPER DIVISION CLASSES	1475	$	71.53
GRADUATE LEVEL CLASSES	483	$	119.03
INDEPENDENT STUDY-THESIS	260	$	184.26
DISSERTATION	425	$	106.28
TOTAL	19080		---

A4.7 STUDENT CREDIT HOUR TABLES:

	LOWER CLASS SCH	UPPER CLASS SCH	MSTRS PRGRM SCH	DCTRS PRGRM SCH
LOWER DIVISION CLASSES	0	0	0	39
UPPER DIVISION CLASSES	0	0	459	249
GRADUATE LEVEL CLASSES	0	0	552	897
INDEPENDENT STUDY-THESIS	0	0	333	447
DISSERTATION	0	0	0	1275

A4.8 DEPARTMENTAL COSTS OF PROGRAMS:

RAW COSTS:

LOWER DIVISION PARTIAL PROGRAM	$	0
UPPER DIVISION PARTIAL PROGRAM		0
MASTERS PROGRAM		159894
DOCTORS PROGRAM		342994

A4.8.1 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A4.8.2 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(136)/(.753) = 180.67

A4.8.3 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
180.67

ADJUSTED PROGRAM COSTS:

LOWER DIVISION PARTIAL PROGRAM	$	0
UPPER DIVISION PARTIAL PROGRAM		0
BACHELORS PROGRAM		0
MASTERS PROGRAM		159894
DOCTORS PROGRAM		342994
GRADUATE PROGRAM,		502888

A4.10 SUMMER TERM:

A4.1	GROSS DEPARTMENTAL COSTS (OTHER THAN T.A. STIPENDS):	$	130422
	DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES ARE ASSUMED IN A4.10 TO BE	$	0
A4.3	NET NON-T.A. DEPARTMENTAL COST	$	130422

A4.4 FACULTY ACTIVITY ANALYSIS DISTRIBUTION:

LOWER DIVISION CLASSES		.315
UPPER DIVISION CLASSES		.108
GRADUATE LEVEL CLASSES		.012
INDEPENDENT STUDY-THESIS		.045
DISSERTATION		.056
(TOTAL INSTRUCTION TIME:	.536)	
SCHOLARLY AND OTHER ACTIVITY		.464
TOTAL		1.000

A4.5 ALLOCATION OF COST (A4.3) TO LEVELS:

A4.5.1 NET DEPARTMENTAL NON-T.A. INSTRUCTION COSTS:

LOWER DIVISION CLASSES
$ 130422 X (.315/ .536) = $ 76647
UPPER DIVISION CLASSES
$ 130422 X (.108/ .536) = $ 26279
GRADUATE LEVEL CLASSES
$ 130422 X (.012/ .536) = $ 2920
INDEPENDENT STUDY-THESIS
$ 130422 X (.045/ .536) = $ 10950
DISSERTATION
$ 130422 X (.056/ .536) = $ 13626

A4.5.2 TEACHING ASSISTANTSHIP STIPENDS:

LOWER DIVISION .80 X $ 19954 = $ 15963

UPPER DIVISION .20 X $ 19954 = $ 3991

A4.5.3 TOTAL DEPARTMENTAL COST ALLOCATION:

LOWER DIVISION CLASSES	$	92610
UPPER DIVISION CLASSES	$	30270
GRADUATE LEVEL CLASSES	$	2920
INDEPENDENT STUDY-THESIS	$	10950
DISSERTATION	$	13626

A4.6 GENERATION AND COSTING OF DEPARTMENTAL SCH:

	SCH PER SUMMER TERM	COST/SCH
LOWER DIVISION CLASSES	3811	$ 24.30
UPPER DIVISION CLASSES	367	$ 82.48
GRADUATE LEVEL CLASSES	139	$ 21.01
INDEPENDENT STUDY-THESIS	292	$ 37.50
DISSERTATION	454	$ 30.01
TOTAL	5063	---

A4.7 STUDENT CREDIT HOUR TABLES:

	LOWER CLASS SCH	UPPER CLASS SCH	MSTRS PRGRM SCH	DCTRS PRGRM SCH
LOWER DIVISION CLASSES	96	407	7	6
UPPER DIVISION CLASSES	6	229	23	18
GRADUATE LEVEL CLASSES	0	1	71	70
INDEPENDENT STUDY-THESIS	0	0	201	88
DISSERTATION	0	0	112	336

A4.8 DEPARTMENTAL COSTS OF PROGRAMS:

RAW COSTS:

LOWER DIVISION PARTIAL PROGRAM	$	2828
UPPER DIVISION PARTIAL PROGRAM		28799
MASTERS PROGRAM		14457
DOCTORS PROGRAM		16485

A4.8.1 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A4.8.2 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(58)/(.753) = 77.05

A4.8.3 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
77.05

ADJUSTED PROGRAM COSTS:

LOWER DIVISION PARTIAL PROGRAM	$	21788
UPPER DIVISION PARTIAL PROGRAM		38259
BACHELORS PROGRAM		60047
MASTERS PROGRAM		14457
DOCTORS PROGRAM		16485
GRADUATE PROGRAM,		30943

A4.11 TWELVE-MONTH YEAR PROGRAM COSTS:

A4.11.1	BACHELORS PROGRAM	$ 60047
A4.11.2	MASTERS PROGRAM	174352
	DOCTORS PROGRAM	359479

SUMMARY OF PROGRAM DEPARTMENTAL COST ANALYSIS

PROGRAM	PROGRAM COST	ESTIMATED NUMBER STUDENTS	COST PER STUDENT
BACHELORS	$ 60047	361.3	$ 166
MASTERS	174352	33.0	5283
DOCTORS	359479	78.0	4609
(GRADUATE	533831	111.0	4809)

1109 CHEMISTRY

COMPCUT

DETAILS OF THE COMPCUT PROCEDURE CALCULATIONS

ACADEMIC YEAR:

COSTS BY OBJECT CATEGORY:

	COST PER ACADEMIC YEAR	COST PER MONTH
FACULTY COMPENSATION	$ 715279	$ 79475
STAFF COMPENSATION	276652	30739
HOURLY WAGES COMPENSATION	24892	2766
T.A. STIPENDS	299368	33263
R.A. STIPENDS	0	0
POSTDOCTORATES BENEFITS	0	0
SUPPLIES AND SERVICES	130027	14447
EQUIPMENT	30000	3333
OTHER COSTS	0	0

FACULTY ACTIVITY ANALYSIS DISTRIBUTIONS:

	FACULTY ACTIVITY ANALYSIS	SCHOLARLY ACTIVITY WEIGHTING FACTORS	WEIGHTED FACULTY ACTIVITY ANALYSIS
LOWER DIVISION CLASSES	.216	1	.216
UPPER DIVISION CLASSES	.125	3	.375
GRADUATE LEVEL CLASSES	.084	5	.420
INDEPENDENT STUDY-THESIS	.070	7	.490
DISSERTATION	.066	10	.660
SCHOLARLY ACTIVITY	.344		
OTHER ACTIVITY	.095		

A5.1 COSTS BY ANALYTICAL CATEGORIES:

		COST PER ACADEMIC YEAR	COST PER MONTH
A5.1.1	CATEGORY 1A (FACULTY)	$ 715279	$ 79475
A5.1.2	CATEGORY 1B (STAFF)	301544	33505
A5.1.3	CATEGORY 2A (T.A.S)	299368	33263
A5.1.4	CATEGORY 2B (R.A.,P.D.S)	0	0
A5.1.5	CATEGORY 3 (OPERATIONS)	160027	17781

A5.3 DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES:

(A) INSTITUTIONS TOTAL INDIRECT COSTS OF DEPARTMENTAL ADMINISTRATION $ 3399912

(B) RATIO OF DEPARTMENTS GRANT AND CONTRACT EXPENDITURES TO TOTAL INSTITUTIONS GRANT AND CONTRACT EXPENDITURES

($ 508071)/($ 69084618) = .0073543

(C) PRODUCT OF (A) AND (B) $ 25004

COST PER MONTH $ 2778

A5.4 CATEGORY 1AT (FACULTY TEACHING) COSTS PER MONTH:

LOWER DIVISION CLASSES	$ 17167
UPPER DIVISION CLASSES	9934
GRADUATE LEVEL CLASSES	6676
INDEPENDENT STUDY-THESIS	5563
DISSERTATION	5245
TOTAL	$ 44586

A5.6 CATEGORY 1AS (SCHOLARLY ACTIVITY) COST PER MONTH:

LOWER DIVISION CLASSES	$ 2733
UPPER DIVISION CLASSES	4744
GRADUATE LEVEL CLASSES	5314
INDEPENDENT STUDY-THESIS	6199
DISSERTATION	8350
TOTAL	$ 27340

A5.7 CATEGORY 1AO (OTHER FACULTY TIME) COST PER MONTH:

LOWER DIVISION CLASSES	$ 1837
UPPER DIVISION CLASSES	1063
GRADUATE LEVEL CLASSES	715
INDEPENDENT STUDY-THESIS	595
DISSERTATION	561
TOTAL (NET OF INDIRECT COST A5.3)	$ 4772

A5.8 CATEGORY 2A (TEACHING ASSISTANT) COST PER MONTH:

	PERCENTAGE	AMOUNT
LOWER DIVISION CLASSES	80.0 %	$ 26610
UPPER DIVISION CLASSES	20.0	6653
GRADUATE LEVEL CLASSES	.0	0
INDEPENDENT STUDY-THESIS	.0	0
DISSERTATION	.0	0
TOTALS	100.0 %	$ 33263

A5.9 ALLOCATIONS OF COSTS OF CATEGORIES 1B,2B AND 3:

	CTGRY 1B	CTGRY 2B	CTGRY 3
LOWER DIVISION CLASSES	12900	0	6846
UPPER DIVISION CLASSES	7465	0	3962
GRADUATE LEVEL CLASSES	5017	0	2662
INDEPENDENT STUDY-THESIS	4181	0	2219
DISSERTATION	3942	0	2092
TOTALS	33505	0	17781

A5.10 INSTRUCTIONAL LEVELS DEPARTMENTAL COSTS PER MONTH:

LOWER DIVISION CLASSES	$ 68094
UPPER DIVISION CLASSES	33822
GRADUATE LEVEL CLASSES	20383
INDEPENDENT STUDY-THESIS	18757
DISSERTATION	20190
TOTAL	$ 161246

A5.5 AUTUMN TERM DEPARTMENTAL STUDENT CREDIT HOURS:

LOWER DIVISION CLASSES	16437
UPPER DIVISION CLASSES	1475
GRADUATE LEVEL CLASSES	483
INDEPENDENT STUDY-THESIS	260
DISSERTATION	425

A5.11 DEPARTMENTAL COST PER STUDENT CREDIT HOUR:

LOWER DIVISION CLASSES	$ 12.43
UPPER DIVISION CLASSES	68.79
GRADUATE LEVEL CLASSES	126.60
INDEPENDENT STUDY-THESIS	216.43
DISSERTATION	142.52

A5.12 STUDENT CREDIT HOUR TABLES:

	LOWER CLASS SCH	UPPER CLASS SCH	MSTRS PRGRM SCH	DCTRS PRGRM SCH
LOWER DIVISION CLASSES	0	0	0	39
UPPER DIVISION CLASSES	0	0	459	249
GRADUATE LEVEL CLASSES	0	0	552	897
INDEPENDENT STUDY-THESIS	0	0	333	447
DISSERTATION	0	0	0	1275

A5.13 DEPARTMENTAL COSTS OF PROGRAMS:

RAW COSTS:

LOWER DIVISION PARTIAL PROGRAM	$ 0
UPPER DIVISION PARTIAL PROGRAM	0
MASTERS PROGRAM	173531
DOCTORS PROGRAM	409633

A5.13.1 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A5.13.2 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(136)/(.753) = 180.67

A5.13.3 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
180.67

ADJUSTED PROGRAM COSTS:

LOWER DIVISION PARTIAL PROGRAM	$ 0
UPPER DIVISION PARTIAL PROGRAM	0
BACHELORS PROGRAM	0
MASTERS PROGRAM	173531
DOCTORS PROGRAM	409633
GRADUATE PROGRAM,	583163

SUMMER TERM:

COSTS BY OBJECT CATEGORY:	COST PER SUMMER TERM	COST PER MONTH
FACULTY COMPENSATION	$ 53836	$ 17945
STAFF COMPENSATION	69163	23054
HOURLY WAGES COMPENSATION	6753	2251
T.A. STIPENDS	19954	6651
R.A. STIPENDS	0	0
POSTDOCTORATES BENEFITS	0	0
SUPPLIES AND SERVICES	670	223
EQUIPMENT	0	0
OTHER COSTS	0	0

FACULTY ACTIVITY ANALYSIS DISTRIBUTIONS:

	FACULTY ACTIVITY ANALYSIS	SCHOLARLY ACTIVITY WEIGHTING FACTORS	WEIGHTED FACULTY ACTIVITY ANALYSIS
LOWER DIVISION CLASSES	.315	1	.315
UPPER DIVISION CLASSES	.108	3	.324
GRADUATE LEVEL CLASSES	.012	5	.060
INDEPENDENT STUDY-THESIS	.045	7	.315
DISSERTATION	.056	10	.560
SCHOLARLY ACTIVITY	.311		
OTHER ACTIVITY	.153		

A5.1 COSTS BY ANALYTICAL CATEGORIES:

		COST PER SUMMER TERM	COST PER MONTH
A5.1.1	CATEGORY 1A (FACULTY)	$ 53836	$ 17945
A5.1.2	CATEGORY 1B (STAFF)	75916	25305
A5.1.3	CATEGORY 2A (T.A.S)	19954	6651
A5.1.4	CATEGORY 2B (R.A.,P.D.S)	0	0
A5.1.5	CATEGORY 3 (OPERATIONS)	670	223

DEPARTMENTAL ADMINISTRATION COSTS FOR GRANT AND CONTRACT ACTIVITIES ARE ASSUMED IN A5.14 TO BE $ 0

A5.4 CATEGORY 1AT (FACULTY TEACHING) COSTS PER MONTH:

LOWER DIVISION CLASSES	$	5653
UPPER DIVISION CLASSES		1938
GRADUATE LEVEL CLASSES		215
INDEPENDENT STUDY-THESIS		808
DISSERTATION		1005
TOTAL	$	9619

A5.6 CATEGORY 1AS (SCHOLARLY ACTIVITY) COST PER MONTH:

LOWER DIVISION CLASSES	$	1117
UPPER DIVISION CLASSES		1149
GRADUATE LEVEL CLASSES		213
INDEPENDENT STUDY-THESIS		1117
DISSERTATION		1986
TOTAL	$	5581

A5.7 CATEGORY 1AO (OTHER FACULTY TIME) COST PER MONTH:

LOWER DIVISION CLASSES	$	1614
UPPER DIVISION CLASSES		553
GRADUATE LEVEL CLASSES		61
INDEPENDENT STUDY-THESIS		231
DISSERTATION		287
TOTAL (NET OF INDIRECT COST A5.3)	$	2746

A5.8 CATEGORY 2A (TEACHING ASSISTANT) COST PER MONTH:

	PERCENTAGE		AMOUNT
LOWER DIVISION CLASSES	80.0 %	$	5321
UPPER DIVISION CLASSES	20.0		1330
GRADUATE LEVEL CLASSES	.0		0
INDEPENDENT STUDY-THESIS	.0		0
DISSERTATION	.0		0
TOTALS	100.0 %	$	6651

A5.9 ALLOCATIONS OF COSTS OF CATEGORIES 1B,2B AND 3:

	CTGRY 1B	CTGRY 2B	CTGRY 3
LOWER DIVISION CLASSES	14872	0	131
UPPER DIVISION CLASSES	5099	0	45
GRADUATE LEVEL CLASSES	567	0	5
INDEPENDENT STUDY-THESIS	2125	0	19
DISSERTATION	2644	0	23
TOTALS	25305	0	223

A5.10 INSTRUCTIONAL LEVELS DEPARTMENTAL COSTS PER MONTH:

LOWER DIVISION CLASSES	$ 28707
UPPER DIVISION CLASSES	10114
GRADUATE LEVEL CLASSES	1061
INDEPENDENT STUDY-THESIS	4298
DISSERTATION	5945
TOTAL	$ 50125

A5.5 SUMMER TERM DEPARTMENTAL STUDENT CREDIT HOURS:

LOWER DIVISION CLASSES	3811
UPPER DIVISION CLASSES	367
GRADUATE LEVEL CLASSES	139
INDEPENDENT STUDY-THESIS	292
DISSERTATION	454

A5.11 DEPARTMENTAL COST PER STUDENT CREDIT HOUR:

LOWER DIVISION CLASSES	$ 22.60
UPPER DIVISION CLASSES	82.68
GRADUATE LEVEL CLASSES	22.90
INDEPENDENT STUDY-THESIS	44.16
DISSERTATION	39.28

A5.12 STUDENT CREDIT HOUR TABLES:

	LOWER CLASS SCH	UPPER CLASS SCH	MSTRS PRGRM SCH	DCTRS PRGRM SCH
LOWER DIVISION CLASSES	96	407	7	6
UPPER DIVISION CLASSES	6	229	23	18
GRADUATE LEVEL CLASSES	0	1	71	70
INDEPENDENT STUDY-THESIS	0	0	201	88
DISSERTATION	0	0	112	336

A5.13 DEPARTMENTAL COSTS OF PROGRAMS:

RAW COSTS:

LOWER DIVISION PARTIAL PROGRAM	$	2665
UPPER DIVISION PARTIAL PROGRAM		28154
MASTERS PROGRAM		16961
DOCTORS PROGRAM		20312

A5.13.1 UPPER DIVISION POPULATION FACTOR
(6235)/(8283) = .753

A5.13.2 ESTIMATED NUMBER PROGRAM JUNIORS-SENIORS
(58)/(.753) = 77.05

A5.13.3 ESTIMATED NUMBER PROGRAM FRESHMEN-SOPHOMORES
77.05

ADJUSTED PROGRAM COSTS:

LOWER DIVISION PARTIAL PROGRAM	$	20538
UPPER DIVISION PARTIAL PROGRAM		37401
BACHELORS PROGRAM		57939
MASTERS PROGRAM		16961
DOCTORS PROGRAM		20312
GRADUATE PROGRAM,		37273

A5.15	TWELVE-MONTH YEAR PROGRAM COSTS:	
A5.15.1	BACHELORS PROGRAM	$ 57939
A5.15.2	MASTERS PROGRAM	190492
	DOCTORS PROGRAM	429944

SUMMARY OF PROGRAM DEPARTMENTAL COST ANALYSIS

PROGRAM	PROGRAM COST	ESTIMATED NUMBER STUDENTS	COST PER STUDENT
BACHELORS	$ 57939	361.3	$ 160
MASTERS	190492	33.0	5772
DOCTORS	429944	78.0	5512
(GRADUATE	620436	111.0	5590)

PROCREDCUT-1

PROGRAM COSTS USING CREDCUT
STUDENT CREDIT HOUR COST ESTIMATES

INSTITUTION 1109

PROGRAMS IN CHEMISTRY

BACHELORS DEGREE PROGRAM:

	LOWER DIVISION CLASSES	UPPER DIVISION CLASSES	GRADUATE CLASSES	GRADUATE LEVEL INDPNDNT RESEARCH
COST PER SCH	$ 25.35	$ 25.35	$ 25.35	$ 25.35
AVERAGE NUMBER OF SCH TAKEN PER DEGREE EARNED	.0	.0	.0	.0

COST OF A BACHELORS DEGREE: $ 0

MASTERS DEGREE PROGRAM:

	LOWER DIVISION CLASSES	UPPER DIVISION CLASSES	GRADUATE CLASSES	INDPNDNT RESEARCH -- THESIS
COST PER SCH	$ 25.35	$ 25.35	$ 25.35	$ 25.35
AVERAGE NUMBER OF SCH TAKEN PER DEGREE EARNED	.0	17.0	29.0	37.0

COST OF A MASTERS DEGREE: $ 2104

DOCTORS DEGREE PROGRAM:

	LOWER DIVISION CLASSES	UPPER DIVISION CLASSES	GRADUATE CLASSES	INDPNDNT RESEARCH -- THESIS	DISSER-TATION
COST PER SCH	$ 25.35	$ 25.35	$ 25.35	$ 25.35	$ 25.35
AVERAGE NUMBER OF SCH TAKEN PER DEGREE EARNED	.0	12.0	79.0	60.0	96.0

COST OF A DOCTORS DEGREE: $ 6262

PROFAACUT-1

PROGRAM COSTS USING FAACUT
STUDENT CREDIT HOUR COST ESTIMATES

INSTITUTION 1109

PROGRAMS IN CHEMISTRY

BACHELORS DEGREE PROGRAM:

	LOWER DIVISION CLASSES	UPPER DIVISION CLASSES	GRADUATE CLASSES	GRADUATE LEVEL INDPNDNT RESEARCH
COST PER SCH	$ 13.85	$ 71.53	$ 119.03	$ 184.26
AVERAGE NUMBER OF SCH TAKEN PER DEGREE EARNED	.0	.0	.0	.0

COST OF A BACHELORS DEGREE: $ 0

MASTERS DEGREE PROGRAM:

	LOWER DIVISION CLASSES	UPPER DIVISION CLASSES	GRADUATE CLASSES	INDPNDNT RESEARCH -- THESIS
COST PER SCH	$ 13.85	$ 71.53	$ 119.03	$ 184.26
AVERAGE NUMBER OF SCH TAKEN PER DEGREE EARNED	.0	17.0	29.0	37.0

COST OF A MASTERS DEGREE: $ 11485

DOCTORS DEGREE PROGRAM:

	LOWER DIVISION CLASSES	UPPER DIVISION CLASSES	GRADUATE CLASSES	INDPNDNT RESEARCH -- THESIS	DISSER-TATION
COST PER SCH	$ 13.85	$ 71.53	$ 119.03	$ 184.26	$ 106.28
AVERAGE NUMBER OF SCH TAKEN PER DEGREE EARNED	.0	12.0	79.0	60.0	96.0

COST OF A DOCTORS DEGREE: $ 31520

PROCOMPCUT-1

PROGRAM COSTS USING COMPCUT
STUDENT CREDIT HOUR COST ESTIMATES

INSTITUTION 1109

PROGRAMS IN CHEMISTRY

BACHELORS DEGREE PROGRAM:

	LOWER DIVISION CLASSES	UPPER DIVISION CLASSES	GRADUATE CLASSES	GRADUATE LEVEL INDPNDNT RESEARCH
COST PER SCH	$ 12.43	$ 66.79	$ 126.60	$ 216.43
AVERAGE NUMBER OF SCH TAKEN PER DEGREE EARNED	.0	.0	.0	.0

COST OF A BACHELORS DEGREE: $ 0

MASTERS DEGREE PROGRAM:

	LOWER DIVISION CLASSES	UPPER DIVISION CLASSES	GRADUATE CLASSES	INDPNDNT RESEARCH -- THESIS
COST PER SCH	$ 12.43	$ 68.79	$ 126.60	$ 216.43
AVERAGE NUMBER OF SCH TAKEN PER DEGREE EARNED	.0	17.0	29.0	37.0

COST OF A MASTERS DEGREE: $ 12849

DOCTORS DEGREE PROGRAM:

	LOWER DIVISION CLASSES	UPPER DIVISION CLASSES	GRADUATE CLASSES	INDPNDNT RESEARCH -- THESIS	DISSER-TATION
COST PER SCH	$ 12.43	$ 68.79	$ 126.60	$ 216.43	$ 142.52
AVERAGE NUMBER OF SCH TAKEN PER DEGREE EARNED	.0	12.0	79.0	60.0	96.0

COST OF A DOCTORS DEGREE: $ 37495

UNIT DEPARTMENTAL COSTS ANALYSIS
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OF INSTITUTION 1109

HEAD-COUNT STUDENT UNIT COSTS:

A8.1 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 100683	$ 402627	
(136)/(.753)	(136)/(.753)	
OR	OR	
$ 557/STUDENT	$ 2229/STUDENT	$ 1393/STUDENT

A8.2 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 15182	$ 51022	
(58)/(.753)	(58)/(.753)	
OR	OR	
$ 197/STUDENT	$ 662/STUDENT	$ 430/STUDENT

A8.3 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 754/STUDENT	$ 2891/STUDENT	$ 1822/STUDENT

A8.4-6 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 163109/ 33	$ 37215/ 46	
OR	OR	
$ 4943/STUDENT	$ 809/STUDENT	$ 5752/STUDENT

A8.7 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 458310/ 78	$ 46900/ 51	
OR	OR	
$ 5876/STUDENT	$ 920/STUDENT	$ 6795/STUDENT

FULL-TIME EQUIVALENT STUDENT UNIT COSTS:

A8.8 NUMBER OF REPORTED ACADEMIC YEAR FTE STUDENTS:

LOWER DIVISION	(0)/(	15) =	.0	FTES
UPPER DIVISION	(0)/(	15) =	.0	FTES
MASTERS LEVEL	(448)/(	10) =	44.8	FTES
DOCTORS LEVEL	(969)/(	10) =	96.9	FTES

NUMBER OF REPORTED SUMMER TERM FTE STUDENTS:

LOWER DIVISION	(102)/(	15) =	6.8	FTES
UPPER DIVISION	(637)/(	15) =	42.5	FTES
MASTERS LEVEL	(414)/(	10) =	41.4	FTES
DOCTORS LEVEL	(518)/(	10) =	51.8	FTES

NOTE: THE UNDERGRADUATE COSTS FIGURES USED BELOW ARE *RAW* PARTIAL PROGRAM COSTS, NOT ADJUSTED FOR EXPECTED CHANGES IN STUDENTS DECLARED MAJORS.

A8.9 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 0 / .0	$ 0 / .0	
OR	OR	
$ 0/STUDENT	$ 0/STUDENT	$ 0/STUDENT

A8.9 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 1340 / 6.8	$ 28121 / 42.5	
OR	OR	
$ 197/STUDENT	$ 662/STUDENT	$ 430/STUDENT

A8.9 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 197/STUDENT	$ 662/STUDENT	$ 430/STUDENT

A8.10 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 163109/ 45	$ 37215/ 41	
OR	OR	
$ 3641/STUDENT	$ 899/STUDENT	$ 4540/STUDENT

A8.11 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 458310/ 97	$ 46900/ 52	
OR	OR	
$ 4730/STUDENT	$ 905/STUDENT	$ 5635/STUDENT

DEGREE UNIT COSTS:

ACADEMIC YEAR COSTS:

BACHELORS	$	503311/	65.80	=	$ 7649
MASTERS	$	163109/	13.40	=	$ 12172
DOCTORS	$	458310/	20.00	=	$ 22916

TWELVE-MONTH YEAR COSTS:

BACHELORS	$	569514/	65.80	=	$ 8655
MASTERS	$	200324/	13.40	=	$ 14950
DOCTORS	$	505210/	20.00	=	$ 25260

UNIT DEPARTMENTAL COSTS ANALYSIS
OF THE CHEMISTRY PROGRAMS
OF INSTITUTION 1109

HEAD-COUNT STUDENT UNIT COSTS:

A8.1 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 131448 / (136)/(.753) OR	$ 337565 / (136)/(.753) OR	
$ 728/STUDENT	$ 1868/STUDENT	$ 1298/STUDENT

A8.2 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 20440 / (58)/(.753) OR	$ 37972 / (58)/(.753) OR	
$ 265/STUDENT	$ 493/STUDENT	$ 379/STUDENT

A8.3 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 993/STUDENT	$ 2361/STUDENT	$ 1677/STUDENT

A8.4-6 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 123520/ 33 OR	$ 31695/ 46 OR	
$ 3743/STUDENT	$ 689/STUDENT	$ 4432/STUDENT

A8.7 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 346719/ 78 OR	$ 39225/ 51 OR	
$ 4445/STUDENT	$ 769/STUDENT	$ 5214/STUDENT

FULL-TIME EQUIVALENT STUDENT UNIT COSTS:

A8.8 NUMBER OF REPORTED ACADEMIC YEAR FTE STUDENTS:

LOWER DIVISION	(0)/(	15) =	.0	FTES
UPPER DIVISION	(0)/(	15) =	.0	FTES
MASTERS LEVEL	(448)/(	10) =	44.8	FTES
DOCTORS LEVEL	(969)/(	10) =	96.9	FTES

NUMBER OF REPORTED SUMMER TERM FTE STUDENTS:

LOWER DIVISION	(102)/(	15) =	6.8	FTES
UPPER DIVISION	(637)/(	15) =	42.5	FTES
MASTERS LEVEL	(414)/(	10) =	41.4	FTES
DOCTORS LEVEL	(518)/(	10) =	51.8	FTES

NOTE: THE UNDERGRADUATE COSTS FIGURES USED BELOW ARE *RAW* PARTIAL PROGRAM COSTS, NOT ADJUSTED FOR EXPECTED CHANGES IN STUDENTS DECLARED MAJORS.

A8.9 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 0 / .0	$ 0 / .0	
OR	OR	
$ 0/STUDENT	$ 0/STUDENT	$ 0/STUDENT

A8.9 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 1804 / 6.8	$ 20928 / 42.5	
OR	OR	
$ 265/STUDENT	$ 493/STUDENT	$ 379/STUDENT

A8.9 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 265/STUDENT	$ 493/STUDENT	$ 379/STUDENT

A8.10 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 123520/ 45	$ 31695/ 41	
OR	OR	
$ 2757/STUDENT	$ 766/STUDENT	$ 3523/STUDENT

A8.11 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 346719/ 97	$ 39225/ 52	
OR	OR	
$ 3578/STUDENT	$ 757/STUDENT	$ 4335/STUDENT

DEGREE UNIT COSTS:

ACADEMIC YEAR COSTS:

BACHELORS	$	469013/	65.80	=	$ 7128
MASTERS	$	123520/	13.40	=	$ 9218
DOCTORS	$	346719/	20.00	=	$ 17336

TWELVE-MONTH YEAR COSTS:

BACHELORS	$	527425/	65.80	=	$ 8016
MASTERS	$	155215/	13.40	=	$ 11583
DOCTORS	$	385944/	20.00	=	$ 19297

UNIT DEPARTMENTAL COSTS ANALYSIS
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HEAD-COUNT STUDENT UNIT COSTS:

A8.1 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 0 / (136)/(.753) OR	$ 0 / (136)/(.753) OR	
$ 0/STUDENT	$ 0/STUDENT	$ 0/STUDENT

A8.2 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 23343 / (58)/(.753) OR	$ 25134 / (58)/(.753) OR	
$ 303/STUDENT	$ 326/STUDENT	$ 315/STUDENT

A8.3 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 303/STUDENT	$ 326/STUDENT	$ 315/STUDENT

A8.4-6 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 34075/ 33 OR	$ 12296/ 46 OR	
$ 1033/STUDENT	$ 267/STUDENT	$ 1300/STUDENT

A8.7 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 73702/ 78 OR	$ 15385/ 51 OR	
$ 945/STUDENT	$ 302/STUDENT	$ 1247/STUDENT

FULL-TIME EQUIVALENT STUDENT UNIT COSTS:

A8.8 NUMBER OF REPORTED ACADEMIC YEAR FTE STUDENTS:

LOWER DIVISION	(0)/(	15) =	.0	FTES
UPPER DIVISION	(0)/(	15) =	.0	FTES
MASTERS LEVEL	(448)/(	10) =	44.8	FTES
DOCTORS LEVEL	(969)/(	10) =	96.9	FTES

NUMBER OF REPORTED SUMMER TERM FTE STUDENTS:

LOWER DIVISION	(102)/(	15) =	6.8	FTES
UPPER DIVISION	(637)/(	15) =	42.5	FTES
MASTERS LEVEL	(414)/(	10) =	41.4	FTES
DOCTORS LEVEL	(518)/(	10) =	51.8	FTES

NOTE: THE UNDERGRADUATE COSTS FIGURES USED BELOW ARE *RAW* PARTIAL PROGRAM COSTS, NOT ADJUSTED FOR EXPECTED CHANGES IN STUDENTS DECLARED MAJORS.

A8.9 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 0 / .0	$ 0 / .0	
OR	OR	
$ 0/STUDENT	$ 0/STUDENT	$ 0/STUDENT

A8.9 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 3029 / 6.8	$ 18920 / 42.5	
OR	OR	
$ 446/STUDENT	$ 446/STUDENT	$ 446/STUDENT

A8.9 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 446/STUDENT	$ 446/STUDENT	$ 446/STUDENT

A8.10 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 34075/ 45	$ 12296/ 41	
OR	OR	
$ 761/STUDENT	$ 297/STUDENT	$ 1058/STUDENT

A8.11 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 73702/ 97	$ 15385/ 52	
OR	OR	
$ 761/STUDENT	$ 297/STUDENT	$ 1058/STUDENT

DEGREE UNIT COSTS:

ACADEMIC YEAR COSTS:

BACHELORS	$	0/	65.80	= $	0
MASTERS	$	34075/	13.40	= $	2543
DOCTORS	$	73702/	20.00	= $	3685

TWELVE-MONTH YEAR COSTS:

BACHELORS	$	48477/	65.80	= $	737
MASTERS	$	46371/	13.40	= $	3461
DOCTORS	$	89087/	20.00	= $	4454

UNIT DEPARTMENTAL COSTS ANALYSIS
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OF INSTITUTION 1109

HEAD-COUNT STUDENT UNIT COSTS:

A8.1 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 0 / (136)/(.753)	$ 0 / (136)/(.753)	
OR	OR	
$ 0/STUDENT	$ 0/STUDENT	$ 0/STUDENT

A8.2 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 21788 / (58)/(.753)	$ 38259 / (58)/(.753)	
OR	OR	
$ 283/STUDENT	$ 497/STUDENT	$ 390/STUDENT

A8.3 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 283/STUDENT	$ 497/STUDENT	$ 390/STUDENT

A8.4-6 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 159894/ 33	$ 14457/ 46	
OR	OR	
$ 4845/STUDENT	$ 314/STUDENT	$ 5160/STUDENT

A8.7 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 342994/ 78	$ 16485/ 51	
OR	OR	
$ 4397/STUDENT	$ 323/STUDENT	$ 4721/STUDENT

FULL-TIME EQUIVALENT STUDENT UNIT COSTS:

A8.8 NUMBER OF REPORTED ACADEMIC YEAR FTE STUDENTS:

LOWER DIVISION	(0)/(	15) =	.0	FTES
UPPER DIVISION	(0)/(	15) =	.0	FTES
MASTERS LEVEL	(448)/(	10) =	44.8	FTES
DOCTORS LEVEL	(969)/(	10) =	96.9	FTES

NUMBER OF REPORTED SUMMER TERM FTE STUDENTS:

LOWER DIVISION	(102)/(	15) =	6.8	FTES
UPPER DIVISION	(637)/(	15) =	42.5	FTES
MASTERS LEVEL	(414)/(	10) =	41.4	FTES
DOCTORS LEVEL	(518)/(	10) =	51.8	FTES

NOTE: THE UNDERGRADUATE COSTS FIGURES USED BELOW ARE *RAW* PARTIAL PROGRAM COSTS, NOT ADJUSTED FOR EXPECTED CHANGES IN STUDENTS DECLARED MAJORS.

A8.9 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 0 / .0	$ 0 / .0	
OR	OR	
$ 0/STUDENT	$ 0/STUDENT	$ 0/STUDENT

A8.9 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 2828 / 6.8	$ 28799 / 42.5	
OR	OR	
$ 416/STUDENT	$ 678/STUDENT	$ 547/STUDENT

A8.9 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 416/STUDENT	$ 678/STUDENT	$ 547/STUDENT

A8.10 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 159894/ 45	$ 14457/ 41	
OR	OR	
$ 3569/STUDENT	$ 349/STUDENT	$ 3918/STUDENT

A8.11 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 342994/ 97	$ 16485/ 52	
OR	OR	
$ 3540/STUDENT	$ 318/STUDENT	$ 3858/STUDENT

DEGREE UNIT COSTS:

ACADEMIC YEAR COSTS:

BACHELORS	$	0/	65.80	=	$ 0
MASTERS	$	159894/	13.40	=	$ 11932
DOCTORS	$	342994/	20.00	=	$ 17150

TWELVE-MONTH YEAR COSTS:

BACHELORS	$	60047/	65.80	=	$ 913
MASTERS	$	174352/	13.40	=	$ 13011
DOCTORS	$	359479/	20.00	=	$ 17974

UNIT DEPARTMENTAL COSTS ANALYSIS
OF THE CHEMISTRY PROGRAMS
OF INSTITUTION 1109

HEAD-COUNT STUDENT UNIT COSTS:

A8.1 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 0	$ 0	
(136)/(.753)	(136)/(.753)	
OR	OR	
$ 0/STUDENT	$ 0/STUDENT	$ 0/STUDENT

A8.2 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 20538	$ 37401	
(58)/(.753)	(58)/(.753)	
OR	OR	
$ 267/STUDENT	$ 485/STUDENT	$ 376/STUDENT

A8.3 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 267/STUDENT	$ 485/STUDENT	$ 376/STUDENT

A8.4-6 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 173531/ 33	$ 16961/ 46	
OR	OR	
$ 5259/STUDENT	$ 369/STUDENT	$ 5627/STUDENT

A8.7 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 409633/ 78	$ 20312/ 51	
OR	OR	
$ 5252/STUDENT	$ 398/STUDENT	$ 5650/STUDENT

FULL-TIME EQUIVALENT STUDENT UNIT COSTS:

A8.8 NUMBER OF REPORTED ACADEMIC YEAR FTE STUDENTS:

LOWER DIVISION	(0)/(	15) =	.0	FTES
UPPER DIVISION	(0)/(	15) =	.0	FTES
MASTERS LEVEL	(448)/(	10) =	44.8	FTES
DOCTORS LEVEL	(969)/(	10) =	96.9	FTES

NUMBER OF REPORTED SUMMER TERM FTE STUDENTS:

LOWER DIVISION	(102)/(	15) =	6.8	FTES
UPPER DIVISION	(637)/(	15) =	42.5	FTES
MASTERS LEVEL	(414)/(	10) =	41.4	FTES
DOCTORS LEVEL	(518)/(	10) =	51.8	FTES

NOTE: THE UNDERGRADUATE COSTS FIGURES USED BELOW ARE *RAW* PARTIAL PROGRAM COSTS, NOT ADJUSTED FOR EXPECTED CHANGES IN STUDENTS DECLARED MAJORS.

A8.9 ACADEMIC YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 0 / .0	$ 0 / .0	
OR	OR	
$ 0/STUDENT	$ 0/STUDENT	$ 0/STUDENT

A8.9 SUMMER TERM COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 2665 / 6.8	$ 28154 / 42.5	
OR	OR	
$ 392/STUDENT	$ 663/STUDENT	$ 527/STUDENT

A8.9 TWELVE-MONTH YEAR COST PER UNDERGRADUATE STUDENT:

COST PER LOWER DIVISION STUDENT	COST PER UPPER DIVISION STUDENT	COST PER UNDERGRADUATE STUDENT
$ 392/STUDENT	$ 663/STUDENT	$ 527/STUDENT

A8.10 COST PER MASTERS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 173531/ 45	$ 16961/ 41	
OR	OR	
$ 3873/STUDENT	$ 410/STUDENT	$ 4283/STUDENT

A8.11 COST PER DOCTORS STUDENT:

ACADEMIC YEAR	SUMMER TERM	12-MONTH YEAR
$ 409633/ 97	$ 20312/ 52	
OR	OR	
$ 4227/STUDENT	$ 392/STUDENT	$ 4619/STUDENT

DEGREE UNIT COSTS:

ACADEMIC YEAR COSTS:

BACHELORS	$	0/	6[illegible]	=	$ 0
MASTERS	$	173531/	13.[illegible]	=	$ 12950
DOCTORS	$	409633/	20.00	=	$ 20482

TWELVE-MONTH YEAR COSTS:

BACHELORS	$	57939/	65.80	=	$ 881
MASTERS	$	190492/	13.40	=	$ 14216
DOCTORS	$	429944/	20.00	=	$ 21497

INSTITUTIONAL SUPPORT COSTS

INSTITUTION 1109

PROGRAMS IN CHEMISTRY

TABLE 9.1

INSTITUTIONAL EXPENDITURES
FROM UNRESTRICTED FUNDS

INSTRUCTION AND DEPARTMENTAL RESEARCH	$ 65674946
LIBRARIES	6031890
STUDENT SERVICES	4950068
PLANT OPERATION AND MAINTENANCE	11802369
GENERAL ADMINISTRATION AND GENERAL INSTITUTIONAL EXPENSE	11380935
EXTENSION AND PUBLIC SERVICES	3158599
AUXILIARY ENTERPRISES	12790265
HOSPITAL	16891125
TOTAL	$ 132680197

TABLE 9.2

INDIRECT COSTS OF GRANTS AND CONTRACTS

DEPARTMENTAL ADMINISTRATION	$	2976147
LIBRARIES		1198818
STUDENT SERVICES		273024
PLANT OPERATION AND MAINTENANCE		2641427
GENERAL ADMINISTRATION		3950670
GRANT AND CONTRACT ADMINISTRATION		892936
EDUCATIONAL BENEFITS		436721
USE OF BUILDINGS		668902
USE OF EQUIPMENT		460519
OTHER		80572
TOTAL	$	13579736

TABLE 9.3

LIBRARIES

ALLOCATIONS OF LIBRARIES COSTS TO PROGRAMS

TOTAL LIBRARIES EXPENDITURES	$	6031890
INDIRECT COSTS OF GRANTS AND CONTRACTS		1198818
ALLOCABLE COSTS OF LIBRARIES	$	4833072

INSTITUTIONAL WEIGHTED STUDENT ALLOCATION FACTOR:

(1 X 26715) + (2 X 7809) = 42333

BACHELORS PROGRAM ALLOCATION:

(1 X 361.3)/(42333) = .0085

.0085 X $ 4833072 = $ 41254

MASTERS PROGRAM ALLOCATION:

(2 X 33)/(42333) = .0016

.0016 X $ 4833072 = $ 7535

DOCTORS PROGRAM ALLOCATION:

(2 X 78)/(42333) = .0037

.0037 X $ 4833072 = $ 17810

BACHELORS PROGRAM COST PER STUDENT:	$	114
MASTERS PROGRAM COST PER STUDENT:	$	228
DOCTORS PROGRAM COST PER STUDENT:	$	228

TABLE 9.4

STUDENT SERVICES

ALLOCATIONS OF STUDENT SERVICES COSTS TO PROGRAMS

TOTAL STUDENT SERVICES EXPENDITURES	$	4950068
INDIRECT COSTS OF GRANTS AND CONTRACTS		273024
ALLOCABLE COSTS OF STUDENT SERVICES	$	4677044

STUDENT SERVICES COST PER STUDENT:

($ 4677044)/(34524) = $ 135.47/STUDENT

BACHELORS PROGRAM ALLOCATION:

$ 135.47 X 361.3 = $ 48952

MASTERS PROGRAM ALLOCATION:

$ 135.47 X 33 = $ 4471

DOCTORS PROGRAM ALLOCATION:

$ 135.47 X 78 = $ 10567

BACHELORS PROGRAM COST PER STUDENT:	$	135
MASTERS PROGRAM COST PER STUDENT:	$	135
DOCTORS PROGRAM COST PER STUDENT:	$	135

TABLE 9.5

PLANT OPERATION AND MAINTENANCE

ALLOCATION OF PLANT OPERATION AND MAINTENANCE COST TO PROGRAMS

	5934463 SQ. FT.	TOTAL SPACE
LESS	1481791 SQ. FT.	NON-COSTING TO PO+M
	4452672 SQ. FT.	BASIC SPACE FOR COST ALLOCATION

AUXILIARY ENTERPRISES PO+M COST:

642721 SQ. FT./ 4452672 SQ. FT. = .1443

.1443 X $ 11802369 = $ 1703613 FOR AUXILIARY ENTERPRISES

INTERMEDIATE PLANT OPERATION AND MAINTENANCE FIGURE:

	$ 11802369	BASIC PLANT OPERATION AND MAINTENANCE FIGURE
LESS	1703613	AUXILIARY ENTERPRISES PO+M FIGURE
	$ 10098756	INTERMEDIATE PO+M FIGURE

HOSPITAL PO+M COST:

349606 SQ. FT./ 4452672 SQ. FT. = .0785

.0785 X $ 11802369 = $ 926675 FOR HOSPITAL

REDUCED PLANT OPERATION AND MAINTENANCE FIGURE:

	$ 10098756	INTERMEDIATE PO+M FIGURE
LESS	926675	HOSPITAL PO+M FIGURE
	$ 9172081	REDUCED PO+M FIGURE

NET PLANT OPERATION AND MAINTENANCE FIGURE:

	$ 9172081	REDUCED PLANT OPERATION AND MAINTENANCE FIGURE
LESS	2641427	PO+M INDIRECT COSTS OF SPONSORED RESEARCH
	$ 6530654	NET PLANT OPERATION AND MAINTENANCE FIGURE TO BE ALLOCATED TO THE EDUCATIONAL PROGRAMS

TABLE 9.5 CONTINUED

ALLOCATION TO THE CHEMISTRY DEPARTMENT:

(65855 SQ. FT.)/(1702135 SQ. FT.) = .0387

.0387 X $ 6530654 = $ 252669 PO+M COST OF CHEMISTRY

DEPARTMENTAL ALLOCATION FACTOR:

(2 X 361) + (3 X 33) + (5 X 78) + (2 X 839) = 2889

BACHELORS PROGRAM ALLOCATION:

(2 X 361.3)/(2889) = .2502

.2502 X $ 252669 = $ 63208

MASTERS PROGRAM ALLOCATION:

(3 X 33)/(2889) = .0343

.0343 X $ 252669 = $ 8659

DOCTORS PROGRAM ALLOCATION:

(5 X 78)/(2889) = .1350

.1350 X $ 252669 = $ 34111

BACHELORS PROGRAM COST PER STUDENT:	$ 175
MASTERS PROGRAM COST PER STUDENT:	$ 262
DOCTORS PROGRAM COST PER STUDENT:	$ 437

TABLE 9.6

GENERAL ADMINISTRATION AND GENERAL INSTITUTIONAL EXPENSE

ALLOCATION OF
GENERAL ADMINISTRATION AND GENERAL INSTITUTIONAL EXPENSE
TO PROGRAMS

	$ 11380935	GENERAL EXPENSE FIGURE
LESS	4843606	GENERAL INDIRECT COSTS OF SPONSORED RESEARCH
	$ 6537329	GENERAL COSTS LESS G+C INDIRECT COSTS

NET GENERAL COST:

$ 12790265	AUXILIARY ENTERPRISES EXPENDITURES
16891125	HOSPITAL EXPENDITURES
$ 29681390	SUM ONE
$ 29681390	
66824805	EDUCATIONAL AND RESEARCH ACTIVITIES EXPENDITURES FROM UNRESTRICTED FUNDS
$ 96506195	SUM TWO

($ 16891125)/($ 96506195) = .1750

.1750 X $ 6537329 = $ 1144205

$ 6537329	
1144205	
$ 5393124	NET GENERAL COST TO BE ALLOCATED TO EDUCATIONAL PROGRAMS

TABLE 9.6 CONTINUED

ALLOCATION TO THE CHEMISTRY DEPARTMENT:

(54.3 F.T.E. FACULTY)/(2009.0 F.T.E. FACULTY) = .0270

.0270 X $ 5393124 = $ 145741 GENERAL COST OF CHEMISTRY

DEPARTMENTAL ALLOCATION FACTOR:

(2 X 361) + (3 X 33) + (5 X 78) + (2 X 839) = 2889

BACHELORS PROGRAM ALLOCATION:

(2 X 361.3)/(2889) = .2502

.2502 X $ 145741 = $ 36459

MASTERS PROGRAM ALLOCATION:

(3 X 33)/(2889) = .0343

.0343 X $ 145741 = $ 4994

DOCTORS PROGRAM ALLOCATION:

(5 X 78)/(2889) = .1350

.1350 X $ 145741 = $ 19675

BACHELORS PROGRAM COST PER STUDENT:	$ 101
MASTERS PROGRAM COST PER STUDENT:	$ 151
DOCTORS PROGRAM COST PER STUDENT:	$ 252

TABLE 9.7

SUMMARY OF INSTITUTIONAL SUPPORT COSTS ALLOCATIONS

	COST PER PROGRAM AND PER STUDENT		
	BACHELORS PROGRAM	MASTERS PROGRAM	DOCTORS PROGRAM
(1) LIBRARIES:			
PER PROGRAM	$ 41254	$ 7535	$ 17810
PER STUDENT	114	228	228
(2) STUDENT SERVICES:			
PER PROGRAM	48952	4471	10567
PER STUDENT	135	135	135
(3) PLANT OPERATION AND MAINTENANCE:			
PER PROGRAM	63208	8659	34111
PER STUDENT	175	262	437
(4) GENERAL ADMINISTRATION:			
PER PROGRAM	36459	4994	19675
PER STUDENT	101	151	252
SUM OF (1), (2) AND (4):			
PER PROGRAM	$ 126665	$ 17000	$ 48052
PER STUDENT	351	515	616
SUM OF (1), (2), (3) AND (4):			
PER PROGRAM	$ 189873	$ 25659	$ 82163
PER STUDENT	525	778	1053

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INSTITUTION 1109

CHEMISTRY DEPARTMENT

STUDENT APPOINTMENTS COSTS
FROM UNRESTRICTED FUNDS

	TOTAL	AVERAGE PER GRADUATE STUDENT
*TEACHING ASSISTANTS APPOINTMENTS	($ 0)	($ 0)
*RESEARCH ASSISTANTS APPOINTMENTS	($ 0)	($ 0)

* NOTE: TEACHING ASSISTANTS, STAFF ASSISTANTS AND RESEARCH ASSISTANTS APPOINTMENTS COSTS HAVE BEEN ACCOUNTED FOR IN THE DEPARTMENTAL COSTS ANALYSES.

	TOTAL	PER STUDENT
FELLOWSHIPS:		
UNDERGRADUATE	$ 0	$ 0
GRADUATE	$ 0	$ 0
**TUITION WAIVERS:		
UNDERGRADUATE	($ -0)	($ 0)
GRADUATE	($ -0)	($ 0)

** NOTE: TUITION WAIVERS DO NOT SPECIFICALLY INVOLVE THE EXPENDITURE OF MONEY BY THE INSTITUTION, SO THEY ARE NOT CONSIDERED TO BE A COST AS WE HAVE DEFINED THAT TERM.

TOTAL STUDENT APPOINTMENTS COSTS FROM ABOVE:		
UNDERGRADUATE	$ 0	$ 0
GRADUATE	$ 0	$ 0

19-0- 1

INSTITUTION 1109

CHEMISTRY DEPARTMENT

GRANT AND CONTRACT EXPENDITURES

TOTAL GRANT AND CONTRACT DIRECT EXPENDITURES IN THE DEPARTMENT	$ 508071

DEPARTMENT CHAIRMANS ESTIMATE OF THE DIRECT EXPENDITURES RELATED TO:

	TOTAL	PER STUDENT
EDUCATIONAL PROGRAMS:		
THE UNDERGRADUATE PROGRAM	$ 0	$ 0
THE MASTERS PROGRAM	$ 0	$ 0
THE DOCTORS PROGRAM	$ 0	$ 0
TOTAL	$ 0	
RESEARCH PROGRAMS (NON/EDUCATIONAL):	$ 0	
OTHER PROGRAMS-PUBLIC SERVICE (NON-EDUCATIONAL):	$ 0	

ESTIMATED PROGRAM COSTS ASSUMING THAT 90% OF GRANT AND CONTRACT EXPENDITURES ARE RELATED TO EDUCATIONAL PROGRAMS:

	TOTAL	PER STUDENT
THE UNDERGRADUATE PROGRAM	$ 0	$ 0
THE MASTERS PROGRAM	$ 0	$ 0
THE DOCTORS PROGRAM	$ 0	$ 0
TOTAL	$ 0	

	TOTAL	DOCTORAL PROGRAM AMOUNT	AMOUNT PER DOCTORAL STUDENT
MINIMUM DIRECT EXPENDITURES REQUIRED TO MAINTAIN THE QUALITY OF THE DOCTORAL PROGRAM	$ 0	$ 0	$ 0
MINIMUM DIRECT EXPENDITURES BELOW WHICH IT WOULD BE ADVISABLE TO TERMINATE THE DOCTORAL PROGRAM	$ 0	$ 0	$ 0

INSTITUTION 1309
CHEMISTRY DEPARTMENT
19-0- 1

PROGRAM COSTS EXPRESSED IN DOLLARS PER STUDENT YEAR

	BACHLRS	MASTERS	DOCTORS	GRADUATES
STUDENT ENROLLMENT	361	33	78	111
DEPARTMENTAL COSTS				
CLASSCUT	$ 1576	$ 6070	$ 6477	$ 6356
CLADCUT	1460	4703	4948	4875
CREDCUT	134	1405	1142	1220
FAACUT	166	5283	4609	4809
COMPCUT	160	5772	5512	5590
INSTITUTIONAL SUPPORT COSTS				
LIBRARIES	$ 114	$ 228	$ 228	$ 228
STUDENT SERVICES	135	135	135	135
PLANT OPERATION AND MAINTENANCE	175	262	437	385
GENERAL EXPENSES	101	151	252	222
TOTALS	$ 525	$ 778	$ 1053	$ 971
APPOINTMENTS COSTS-UNRESTRICTED FUNDS				
FELLOWSHIPS	$ 0	$ 0	$ 0	$ 0
TEACHING ASSISTANTSHIPS	(0)	(0)	(0)	(0)
RESEARCH ASSISTANTSHIPS	(0)	(0)	(0)	(0)
TUITION WAIVERS	(0)	(0)	(0)	(0)
TOTALS	$ 0	$ 0	$ 0	$ 0
GRANT AND CONTRACT EXPENDITURES (TOTAL DEPARTMENTAL GRANT AND CONTRACT EXPENDITURES IN 19-0- 1 = $ 508071.)				
90% LEVEL	$ 0	$ 0	$ 0	$ 0
CHAIRMANS ESTIMATE I	0	0	0	0
CHAIRMANS ESTIMATE II			0	
GRAND TOTALS*				
1. CLADCUT: 90% GRANT AND CONTRACT	$ 1985	$ 5481	$ 6001	$ 5847
2. CLADCUT: CHAIRMANS ESTIMATE I	1985	5481	6001	5847
3. COMPCUT: 90% GRANT AND CONTRACT	686	6550	6565	6561
4. COMPCUT: CHAIRMANS ESTIMATE I	686	6550	6565	6561

* NOTE: GRAND TOTALS INCLUDE DEPARTMENTAL COSTS, INSTITUTIONAL SUPPORT COSTS, APPOINTMENTS COSTS AND GRANT AND CONTRACT EXPENDITURES.

APPENDIX R
CORRELATIONS

UNIVERSITY OF WASHINGTON ACADEMIC COMPUTER CENTER

S P S S - - STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES

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LAST UPDATED -- OCTOBER 10, 1977

CHEMISTRY → "FORCED"

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RUN NAME        GRADCOST MULTIPLE REGRESSION
FILE NAME       WMREG
VARIABLE LIST   DCOST,N,GSCH,NPHD,GSAS,SR,RA,TI
VAR LABELS      DCOST DEPARTMENTAL COST/
                N NUMBER OF GRADUATE STUDENTS/
                GSCH GRADUATE SCH-TOTAL SCH RATIO/
                NPHD NUMBER PHD AWARDS PER STUDENT PER YEAR/
                GSAS GS-AS RATIO/
                SR SPONSORED RESEARCH PER FACULTY MEMBER/
                RA ROOSE-ANDERSON RATING/
                TI TYPE OF INSTITUTION
INPUT FORMAT    FIXED(8F10.2)
```

ACCORDING TO YOUR INPUT FORMAT, VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE	FORMAT	RECORD	COLUMNS
DCOST	F10.2	1	1- 10
N	F10.2	1	11- 20
GSCH	F10.2	1	21- 30
NPHD	F10.2	1	31- 40
GSAS	F10.2	1	41- 50
SR	F10.2	1	51- 60
RA	F10.2	1	61- 70
TI	F10.2	1	71- 80

THE INPUT FORMAT PROVIDES FOR 8 VARIABLES. 8 WILL BE READ
IT PROVIDES FOR 1 RECORDS (*CARDS*) PER CASE. A MAXIMUM OF 80 *COLUMNS* ARE USED ON A RECORD.

```
N OF CASES      11
```

ELAPSED TIME FOR JOB SO FAR .228 CP SECONDS

```
REGRESSION      VARIABLES = DCOST TO TI/
                REGRESSION=DCOST WITH GSAS(10),NPHD(8),N(6),SR(4)/RESID=0
STATISTICS      1,2,3,4,5,6
READ INPUT DATA
```

052400 CM NEEDED FOR REGRESSION

GRADCOST MULTIPLE REGRESSION 02/13/78

FILE WMREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION * * * * * * * * * *

VARIABLE	MEAN	STANDARD DEV	CASES
DCOST	3.7645	.1774	11
N	1.8300	.3821	11
GSCH	1.9600	.1851	11
NPHD	2.2800	.1022	11
GSAS	3.5645	.1352	11
SR	4.3064	.2400	11
RA	5.8182	2.8833	11
TI	1.5455	.5722	11

CHEMISTRY

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

N	-.22794						
GSCH	.46097	-.43296					
NPHD	.84579	-.41725	.43345				
GSAS	.57965	-.83535	.51111	.65316			
SR	-.47410	.35979	.01733	-.40580	-.35154		
RA	-.16343	-.88816	.26412	.08316	.53223	-.21351	
TI	.30519	-.89704	.61019	.43104	.85392	-.12622	.70335
	DCOST	N	GSCH	NPHD	GSAS	SR	RA

FILE WHREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION *

DEPENDENT VARIABLE.. DCOST DEPARTMENTAL COST

MEAN RESPONSE 3.76455 STD. DEV. .17739

CHEMISTRY

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GSAS GS-AS RATIO

MULTIPLE R	.57965	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.33599	REGRESSION	1.	.10573	.10573	4.55401	.062
ADJUSTED R SQUARE	.26221	RESIDUAL	9.	.20895	.02322		
STD DEVIATION	.15237	COEFF OF VARIABILITY	4.0 PCT				

VARIABLES IN THE EQUATION

VARIABLE	B	STD ERROR B	F SIGNIFICANCE	BETA ELASTICITY
GSAS	.76077436	.35649936	4.5540126 .062	.5796464 .72036
(CONSTANT)	1.0527307	1.2715883	.68539586 .429	

VARIABLES NOT IN THE EQUATION

VARIABLE	PARTIAL	TOLERANCE	F SIGNIFICANCE
NPHD	.75715	.57338	10.747508 .011
N	.57208	.30220	3.8919641 .084
SR	-.35437	.87642	1.1488994 .315

* * * * * * * * * * * * * * * * * * * \

FILE WHREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION *

DEPENDENT VARIABLE.. DCOST DEPARTMENTAL COST

CHEMISTRY

VARIABLE(S) ENTERED ON STEP NUMBER 3.. N NUMBER OF GRADUATE STUDENTS

MULTIPLE R	.89486	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F SIGNIFICANCE
R SQUARE	.80078	REGRESSION	3.	.25198	.08399	9.37879 .008
ADJUSTED R SQUARE	.71539	RESIDUAL	7.	.06269	.00896	
STD DEVIATION	.09463	COEFF OF VARIABILITY	2.5 PCT			

VARIABLES IN THE EQUATION

VARIABLE	B	STD ERROR B	F SIGNIFICANCE	BETA ELASTICITY
CSAS	.77683605	.50817378	2.33666683 .170	.5918841 .3556
NPHD	1.15659987	.40661007	8.09552317 .021	.6906204 .72617
R	.25749586	.14977180	2.95558366 .129	.5546476 .12517
(CONSTANT)	-2.2094564	1.6805136	1.72856944 .230	

VARIABLES NOT IN THE EQUATION

VARIABLE	PARTIAL	TOLERANCE	F SIGNIFICANCE
SR	-.46969	.78152	1.69982839 .240

FILE WHREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION *

DEPENDENT VARIABLE.. DCOST DEPARTMENTAL COST

CHEMISTRY

VARIABLE(S) ENTERED ON STEP NUMBER 4.. SR SPONSORED RESEARCH PER FACULTY MEMBER

MULTIPLE R	.91909	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F SIGNIFICANCE
R SQUARE	.84473	REGRESSION	4.	.26581	.06645	8.16034 .013
ADJUSTED R SQUARE	.74121	RESIDUAL	6.	.04886	.00814	
STD DEVIATION	.09024	COEFF OF VARIABILITY	2.4 PCT			

VARIABLES IN THE EQUATION

VARIABLE	B	STD ERROR B	F SIGNIFICANCE	BETA ELASTICITY
GSAS	.84783470	.48763171	3.0230024	.6459791
			.133	.80279
NPHD	1.0369047	.40719318	6.4845033	.5972547
			.044	.62800
N	.29999945	.14649456	4.1937057	.6462006
			.086	.14583
SR	-.17530019	.13451702	1.6982839	-.2371424
			.240	-.20053
(CONSTANT)	-1.4158352	1.7143001	.68210580	
			.440	

VARIABLES NOT IN THE EQUATION

VARIABLE	PARTIAL	TOLERANCE	F SIGNIFICANCE

ALL VARIABLES ARE IN THE EQUATION.

COEFFICIENTS AND CONFIDENCE INTERVALS.

VARIABLE	B	STD ERROR B	T	95.0 PCT CONFIDENCE INTERVAL
GSAS	.84783470	.48763171	1.7386784	-.34535068 , 2.0410201
NPHD	1.0369047	.40719318	2.5464688	.40544277E-01, 2.0332651
N	.29999945	.14649456	2.0478539	-.58457881E-01, .65845678
SR	-.17530019	.13451702	-1.3031822	-.50444971 , .15384933
CONSTANT	-1.4158352	1.7143001	-.82589697	-5.6105536 , 2.7788833

FILE WMREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION *

DEPENDENT VARIABLE.. DCOST DEPARTMENTAL COST

CHEMISTRY

SUMMARY TABLE

STEP	VARIABLE ENTERED	VARIABLE REMOVED	F TO ENTER OR REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE	R SQUARE CHANGE	SIMPLE R	OVERALL F	SIGNIFICANCE
1	GSAS		4.55401	.062	.57965	.33599	.33599	.57965	4.55401	.062
2	NPHD		10.74751	.011	.84655	.71665	.38066	.84579	10.11689	.006
3	N		2.95564	.129	.89486	.80078	.08412	-.22794	9.37879	.008
4	SR		1.69828	.240	.91909	.84473	.04395	-.47410	8.16034	.013

GRADCOST MULTIPLE REGRESSION 02/13/78

FILE WMREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION * * * * * * * *

OBSERVATION	Y VALUE	Y ESTIMATE	RESIDUAL	-2SD	0.0
1.	3.630000	3.698931	-.6893093E-01		I
2.	3.750000	3.746221	.3778803E-02		I.
3.	3.810000	3.848443	-.3844274E-01		I
4.	3.900000	3.887190	.1280996E-01		I
5.	3.720000	3.587079	.1329213		I
6.	3.630000	3.701822	-.7182221E-01		I
7.	3.500000	3.556423	-.5642325E-01		I
8.	4.070000	3.954801	.1151986		I
9.	3.600000	3.565803	.3419687E-01		I
10.	4.020000	4.051660	-.3166067E-01		I
11.	3.780000	3.811626	-.3162626E-01		I

CHEMISTRY

NOTE = (*) INDICATES ESTIMATE CALCULATED WITH MEANS SUBSTITUTED
R INDICATES POINT OUT OF RANGE OF PLOT

NUMBER OF CASES PLOTTED 11.
NUMBER OF 2 S.D. OUTLIERS 0 OR 0 PERCENT OF THE TOTAL

VON NEUMANN RATIO 2.40062 DURBIN-WATSON TEST 2.18239

NUMBER OF POSITIVE RESIDUALS 5.
NUMBER OF NEGATIVE RESIDUALS 6.
NUMBER OF RUNS OF SIGNS 7.

NORMAL APPROXIMATION TO SIGN DISTRIBUTION IMPOSSIBLE.
USE A TABLE FOR EXPECTED VALUES.

GRADCOST MULTIPLE REGRESSION 02/13/78

FILE GMREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION * * * * * * *

VARIABLE	MEAN	STANDARD DEV	CASES
DCOST	3.7599	.3165	6
N	1.4677	.4098	6
GSCH	2.7764	.2501	6
NPHD	2.2166	.1757	6
GSAS	3.7543	.3485	6
SR	4.6610	.2038	6
RA	5.1667	2.8402	6
TI	1.5000	.5477	6

BIOCHEMISTRY

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

N	.00834						
GSCH	-.20076	-.95559					
NPHD	-.37376	-.30154	.49418				
GSAS	.76449	-.48480	.26162	-.49481			
SR	.34074	.82923	-.64377	-.09272	-.26775		
RA	-.17768	-.82884	.72014	-.10591	.44208	-.88296	
TI	-.20562	-.90037	.97940	.51841	.20775	-.84689	.64282
	DCOST	N	GSCH	NPHD	GSAS	SR	RA

GRADCOST MULTIPLE REGRESSION 02/13/78

FILE GMREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION * * * * * * *

VARIABLE	MEAN	STANDARD DEV	CASES
DCOST	3.4554	.1736	8
N	1.8176	.3098	8
GSCH	1.9658	.2311	8
NPHD	2.0269	.1049	8
GSAS	3.4865	.1435	8
SR	2.7838	1.7837	8
RA	7.6875	2.8276	8
TI	1.3750	.5175	8

ECONOMICS

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

N	-.41910						
GSCH	.65266	-.32614					
NPHD	.64771	-.24060	.55677				
GSAS	.49894	-.52638	.07460	.30203			
SR	-.00231	.81431	-.09561	.01112	-.18417		
RA	-.02203	-.81709	-.12730	-.05566	.36987	-.80415	
TI	.46452	-.73649	.58563	.41533	.01355	-.70692	.38437
	DCOST	N	GSCH	NPHD	GSAS	SR	RA

GRADCOST MULTIPLE REGRESSION 02/13/78

FILE WMREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION * * * * * * *

VARIABLE	MEAN	STANDARD DEV	CASES
DCOST	3.2148	.2249	10
N	2.1767	.4118	10
ESCH	1.9916	.2494	10
NPHD	1.9943	.1954	10
GSAS	3.0287	.7674	10
SR	2.1663	1.5338	10
RA	5.5000	2.9439	10
TI	1.5000	.5270	10

ENGLISH

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

N	-.43750						
GSCH	-.08166	-.22270					
NPHD	.70968	-.62591	-.39308				
GSAS	.30723	-.07741	.05521	.29550			
SR	.13420	.43787	.08737	-.43108	-.34908		
RA	-.02715	-.84516	.37049	.31422	-.13861	-.56957	
TI	.42676	-.89629	.45721	.40199	-.04696	-.13237	.75192
	DCOST	N	GSCH	NPHD	GSAS	SR	RA

GRADCOST MULTIPLE REGRESSION 02/13/78

FILE SNPEG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION * * * * * *

VARIABLE	MEAN	STANDARD DEV	CASES
DCOST	3.6412	.2476	9
N	1.8030	.4966	9
GSCH	1.6929	.2137	9
NPHD	1.9832	.2110	9
GSAS	3.7099	.3090	9
SR	3.2274	1.2330	9
RA	6.4444	3.4591	9
TI	1.4444	.5270	9

MATHEMATICS

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

N	-.42303						
GSCH	.29686	.41240					
NPHD	.38688	.42516	.71112				
GSAS	.97379	-.41348	.17946	.30798			
SR	-.21364	.69780	.55889	.78463	-.26895		
RA	-.19457	-.50602	-.20206	-.67681	-.17827	-.59334	
TI	.53306	-.42863	.30329	-.12476	.45492	-.35396	.35806
	DCOST	N	GSCH	NPHD	GSAS	SR	RA

GRADCOST MULTIPLE REGRESSION 02/13/78

FILE WMREG (CREATION DATE = 02/13/78)

* MULTIPLE REGRESSION * * * * * * *

VARIABLE	MEAN	STANDARD DEV	CASES
DCOST	3.5230	.1756	9
N	1.9001	.2757	9
GSCH	1.9533	.2193	9
NPHD	2.1364	.1213	5
GSAS	3.5052	.0848	9
SR	3.4151	1.3751	9
RA	4.5000	3.0721	9
TI	1.4444	.5270	5

PSYCHOLOGY

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

N	-.27678						
GSCH	.08257	-.34205					
NPHD	.53893	-.10018	.14828				
GSAS	.64590	-.17130	.34801	.60751			
SR	.17111	.37768	-.39053	.21009	.34529		
RA	-.47102	-.65547	.23047	-.13147	-.35277	-.61396	
TI	.15427	-.95801	.39450	.13272	.05607	-.48760	.73343
	DCOST	N	GSCH	NPHD	GSAS	SR	RA